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NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

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— Begins in this issue

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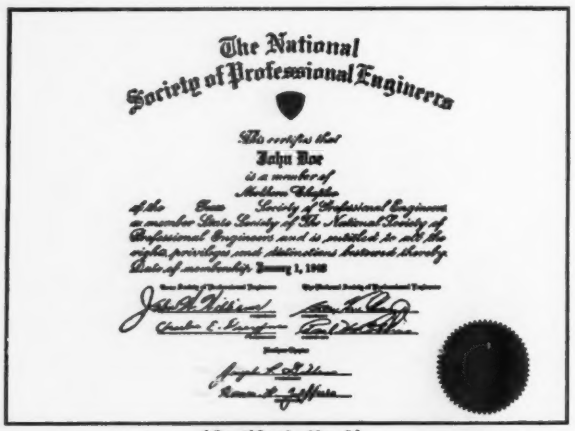

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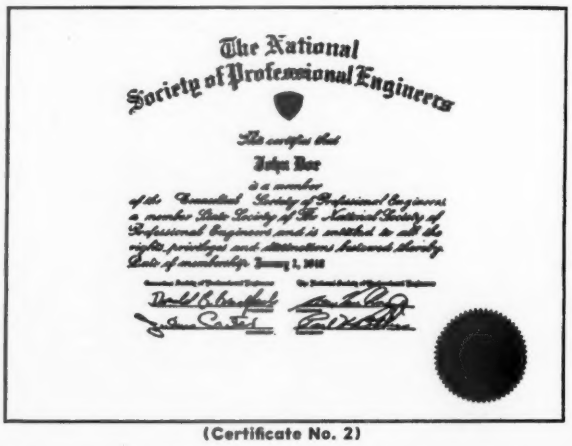

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Editor
FRANKLIN F. PAGE

Business Manager
RUSSELL B. ALLEN

Publications Committee
C. GEORGE KRUEGER, Chairman

●

Editorial and Executive Offices
1121 Fifteenth St., N. W.
Washington 5, D. C.

●

THE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
Headquarters:
1121 Fifteenth St., N. W.
Washington 5, D. C.

President, ALAN G. STANFORD
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Box 91
Albuquerque, N. M.

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4610 Hartwick Road
College Park, Md.

Executive Director, PAUL H. ROBBINS
1121 Fifteenth St., N. W.
Washington 5, D. C.

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Future Outlook for Engineering Profession Pictured in Labor Department Survey

Jobs in engineering—the Nation's third largest profession and one of its fastest growing—may increase by as many as 100,000 in the next 10 or 12 years to a total of roughly 450,000.

After the next few years, if engineering enrollments decline to levels suggested by past trends and if the oversupply of graduates is absorbed into other types of work, opportunities for new graduates will be considerably better.

Over the next decade engineering school facilities and instructional staff should be provided to meet a demand for roughly twice as many graduates as were turned out annually in the prewar decade.

Salaries of younger engineers have increased relative to those of more experienced men in recent years. Earnings of beginning electrical engineers, for example, increased 66 per cent from 1929 to 1946, those of engineers with 10 years of experience 22 per cent and those of men with 25 years of experience 11 per cent.

The greatest increase in earnings of engineers occurs in the first ten years of experience; after about 30 years of experience there tends to be a levelling off of average salaries.

Good training is increasingly important in the profession. Engineers with the master's degree earn, on the average, slightly more than those with the bachelor's but men with the doctor's degree earn considerably more than either of these groups.

The profession offers employment flexibility; between 1939 and 1946 more than 30 per cent of the engineers changed employment location from one state to another, at least 25 per cent changed their industry field, and from 8 to 14 per cent of those employed in each of the major branches of the profession in 1939 had moved to another branch by 1946. Close relationship among the branches and similarity of basic training is also reflected in the fact that more than 20 per cent of the engineers were educated in a branch of engineering other than that in which they were employed in 1946.

These are the main conclusions of a comprehensive study of the employment outlook for engineers recently completed by the bureau of labor statistics of the U. S. Department of Labor. The study—one of the bureau's occupational outlook series—will be published next Fall.

Survey Findings

In detail, the survey found:

1. The number of engineers increased nearly ten times between 1890 and 1940, rising from 27,000 to 260,000. By the Spring of 1948, the profession may have numbered around 350,000—an increase of about 38 per cent since 1940, stimulated by the great wartime dependence upon technology, by the expansion of research activity in industry and in government and by the desire of industry to make practical use of recent technological discoveries.

2. The profession's long-term growth resulted from two principal factors: the types of industrial activity which use engineers expanded rapidly, and engineers were used to an increasing extent within these industries. From 1890 to 1940, for example, there was a three-fold increase in the total number of workers attached to the basic commodity-producing and transporting industries (manufacturing, mining, construction, transportation and public utilities), which employ three out of four members of the profession. The war and postwar periods witnessed a large additional increase in employment in these industries, and in the Spring of 1948 the number of workers attached to them was 19 per cent more than in 1940. On the increased utilization of engineers side of the ledger, numbers in the profession actually increased three times as fast as would be accounted for by the growth of the five major industries in which most engineers were employed.

3. Examination of the trends in the use of engineers in each major industry leads to the conclusion that their employment should continue to increase relative to other workers in industry. The ratio of total employes to engineers is likely to decrease substantially, at least until 1960, although the rate of decrease may become less. By 1960—assuming that high levels of business activity are maintained and that the U. S. will not be engaged in a major war within the next decade—it may be estimated that total engineering employment will rise to roughly 450,000, some 100,000 more than in 1948. The expansion would average about 8,000 jobs per year from 1948 to 1960, although the yearly increase would vary. This estimate is not presented as a forecast, BLS explained, but only to suggest the large magnitude of the increase in demand for engineers which is indicated by past trends and present developments.

4. Because of the growth of the engineering profession, losses owing to death and retirement have been growing steadily, from about 25,000 in the decade 1920-1930 to over 40,000 in the decade 1930-1940, according to estimates based on tables of working life expectancy. Over the entire 1940-1950 decade, losses to the engineering profession arising solely from death and retirement will number between 55,000 and 60,000. Over the decade 1950-1960, losses to the profession will probably total about 80,000. Total loss to the profession by normal transfers out of the profession—estimated on the basis of one-half of one per cent of the established members of the profession and 5 per cent per year among engineering graduates who do not enter the profession—in the 1940-1950 decade is estimated at approximately 30,000, in the 1950-1960 decade at 40,000 (compared with an estimated minimum of 50,000 younger engineers who left the profession in the depression decade of the 1930's).

In summary, then, losses from all factors may be about 9,000 to 10,000 a year currently, or about 3 per cent of the membership of the profession (6,000 to 7,000 from death and retirement and about 3,000 a year from transfers). Toward the end of the 1950-1960 decade, losses from all factors should rise to about 13,000 a year (9,000 from death and retirement and about 4,000 a year from transfers).

5. The demand for engineering graduates in the United States for the next decade—estimated by adding to the expected annual losses the average annual predicted increase in employment—thus would approximate 17,000 to 18,000 annually for the next several years, with the demand toward the end of the 1950-1960 decade showing signs of rising to around 21,000 or 22,000 a year.

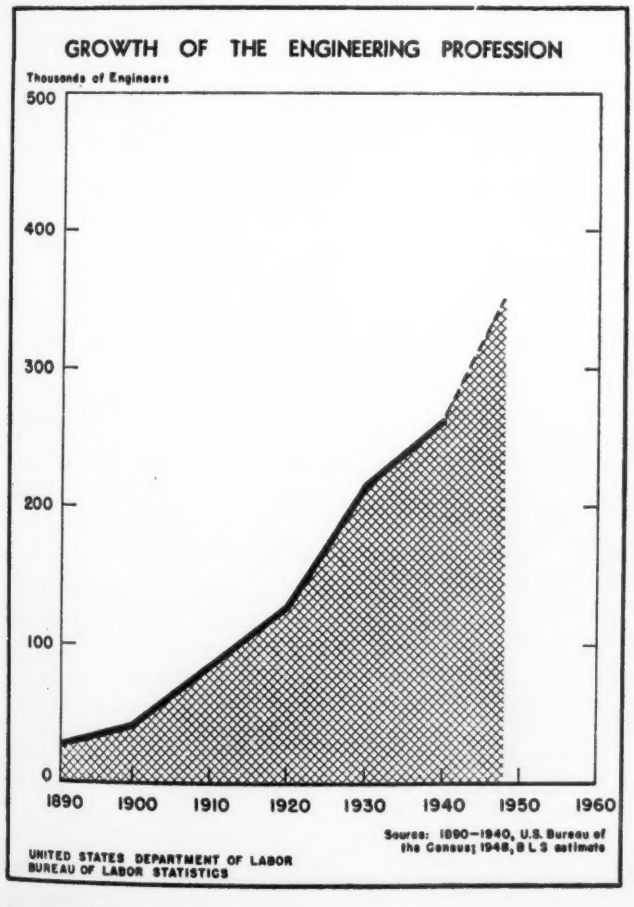
6. In line with the general increase in college graduations, the number of men receiving engineering degrees rose from an average of 7,000 a year in the 1920's to about 10,000 a year in the 1930's; and the number now is approaching unprecedented heights owing to the tremendous postwar expansion in engineering enrollments—in the academic year 1947-1948, some 32,000 engineering students were graduated—an all-time peak—and on the basis of 1948 Fall term enrollments, it may be estimated that about 41,000 engineering students will be graduated in 1949, more than 47,000 in 1950, about 36,000 in 1951 and nearly 29,000 in 1952. On the basis of past trends in college enrollment, the proportions of college students entering engineering training, survival rates of students and future population trends, it may be estimated that the number of engineering degrees awarded annually may decline to 18,000 in 1956 and then rise gradually to at least 25,000 in 1965.

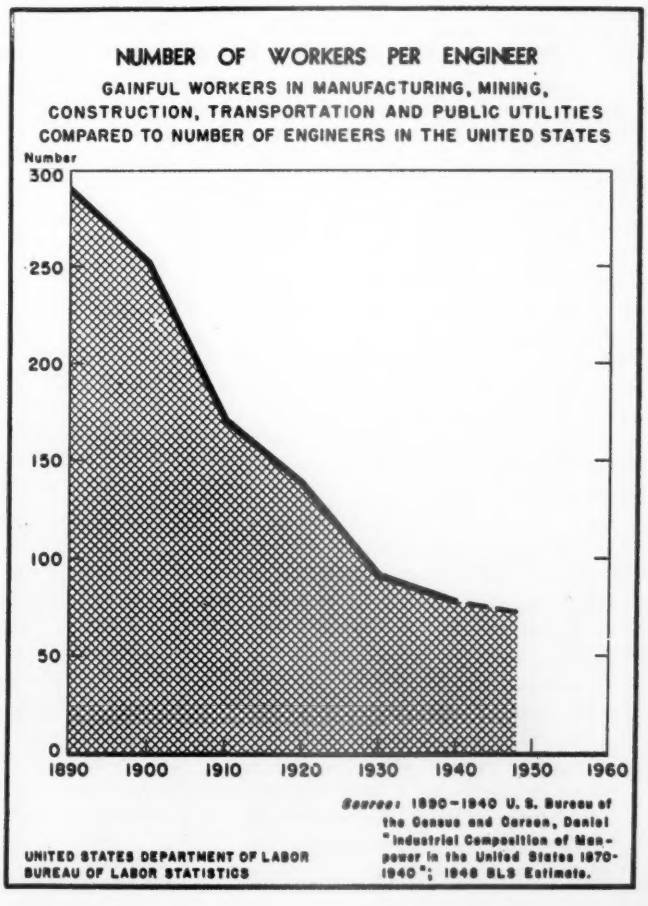
7. A comparision of the estimated supply with demand for engineering graduates leads to several conclusions. The number of graduates will greatly exceed the number of engineering job openings in the next few years. After that, if past trends affecting enrollments should continue to operate, the annual demand for graduates and the supply of new graduates would roughly balance. That appraisal of the outlook, BLS says, is based on the assumption of a high level of general economic activity. Difficulties which face graduates of the next few years will be intensified by a decline in general business conditions. And the appraisal is based solely on comparisons of the prospective demand with the expected supply of engineering graduates and does not allow for the likelihood that some engineering jobs will be filled, as in the past, by men without degrees (35,000 persons without degrees entered the profession in the 1920's, at least 26,000 in the 1930's). In view of the long-run trend toward requiring formal engineering training and the ample supply of graduates, it seems likely that nongraduates will have greater difficulty in getting jobs than in recent years.

8. Among the various branches of the profession, it is likely that the oversupply of new graduates will be largest in electrical engineering. Some mechanical engineering specialties are likely to have an oversupply before others. In the civil, mining and metallurgical fields, oversupply is expected to occur later and in less degree than in the other branches.

Intensified competition for nearly all types of beginning engineering jobs will be experienced within the next few years. Students now in school would be well advised to get the best possible training. Minimum educational requirements are being raised gradually and the proportion of engineers with advanced degrees, though small, is increasing.

For high school students who will graduate from college at least four to five years hence, the outlook is more difficult to evaluate. As pointed out above, the profession is expanding rapidly in the long run. If those graduates of the next few years who cannot get jobs in engineering find employment in and remain in other types of work, and if engineering enrollments decline to levels suggested by past





trends, opportunities for engineering graduates 5 or more years hence will be considerably better than for those in the immediate future. But if many engineering graduates of the next few years who do not get engineering employment continue to seek such work, opportunities for new graduates may be less promising.

Educational Outlook

To the engineering schools, the estimates presented here may suggest that over the long run there will be a demand for roughly twice as many graduates as were turned out annually in the decade before the war and that facilities and instructional staff will have to be provided. The great interest in engineering also suggests that there is both the opportunity and the need for a careful selection of students.

Counselors in high schools, colleges and other agencies providing vocational guidance have to interpret these conclusions to the individual. The increasingly competitive situation expected for the next few years—in an occupation which, in any case, makes great demands on the student's ability and perseverance—may give pause to the marginal student, but should not be allowed to deter those with real aptitude and realistic interest in engineering, BLS said.

9. In all fields of engineering, beginners' monthly salaries were cut less from 1929 to 1934, both in dollars (about $35) and percentagewise (26 per cent), than were those of more experienced engineers. During the depression year of 1934, for example, engineers with 10 years of experience received approximately $100 less a month than similarly experienced engineers in 1929—a drop of 30 per cent in average salaries. In most fields, it was a decade or more before salaries of the experienced engineers had returned to the 1929 average. Earnings increased considerably during and after the war until by 1946 they averaged about 50 per cent higher than seven years earlier. Further increases have taken place since that time.

For most engineers, earning capacity increases with added years of experience. In general, the greatest rise in earnings occurs in the first ten years of experience. In 1946, the increase for each year of experience averaged $120 to $240 annually. After about 30 years of experience, there tends to be a levelling off of average salaries. Although entrance salaries in 1946 in all fields of the profession were very close together, ranging from an average of $226 to $247 per month, there were differences among the branches of the profession in the amount by which earnings increased with years of experience. Median earnings of chemical engineers, for example, showed an increase of about $440, or 185 per cent, during the working span, while median earnings of civil engineers increased by only 85 per cent. Other types of engineers had increases of from 140 to 165 per cent.

10. The type of work performed by an engineer has much to do with the amount of money which he is able to earn. Top salaries in all the major fields are earned by engineers in administration-management jobs — positions usually attained only after many years of experience. When earnings are considered in relation to length of experience, it is found that jobs in research and sales, as well as administration, generally pay more than such work as inspection, analysis and testing, operation and college teaching.

11. There are wide differences in educational attainment of engineers both within the branches of the profession and between branches. Only about 10 to 20 per cent have masters degrees and a relatively small number doctorates. By and large, earnings are highest for engineers with the greatest amount of formal education—experience being comparable. In most fields, holders of masters degrees average slightly greater earnings than those with bachelors degrees, but the men with doctorates earn considerably more than those in either of the other groups.

12. Engineers employed by private firms and those employed by the federal government had comparable average salaries in 1946, when length of experience is taken into account. Engineers employed by state and local governments generally had lower earnings.

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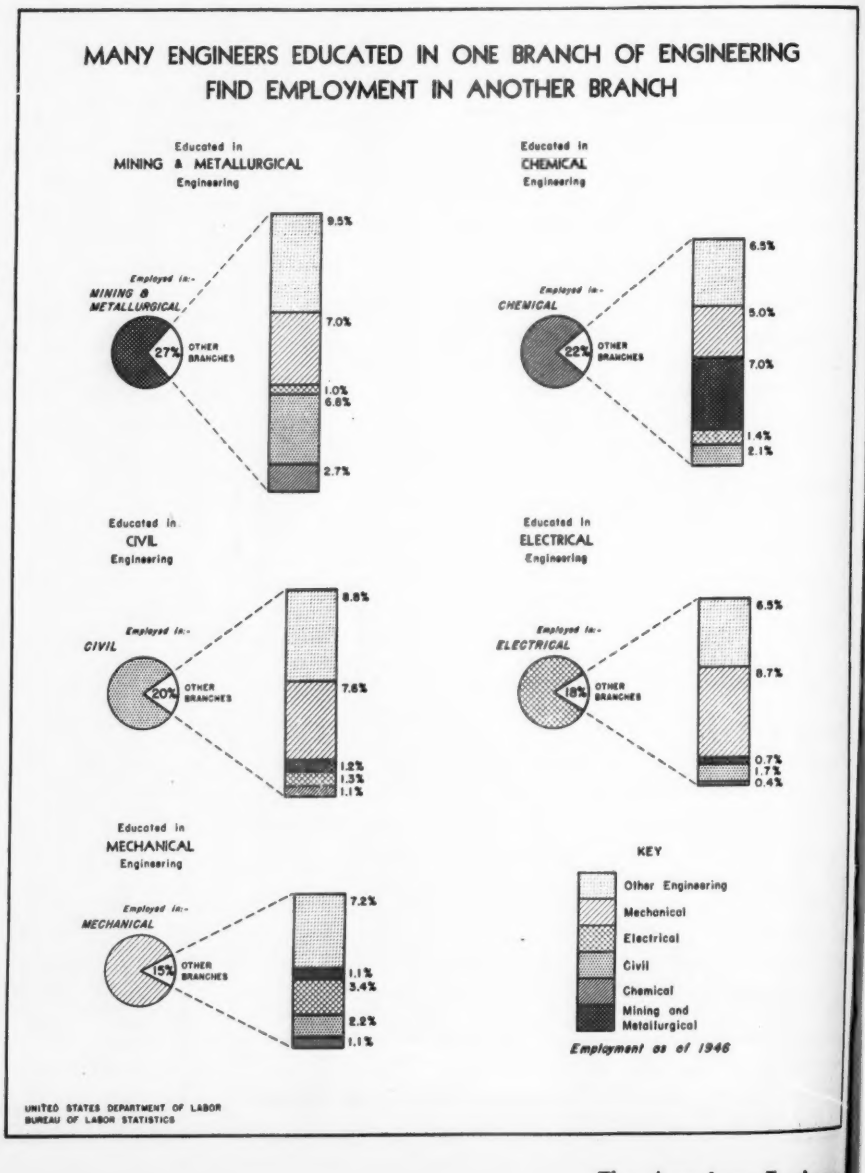


Lawyer Warns of Overzealousness Dangers in Law Enforcement Drive

By JOHN L. WADDLETON
Manager, Labor Section, Legal Division
Allis-Chalmers Manufacturing Co.

Question of licensing for the engineering profession raises—to a labor law attorney—the possibility of conflict between two fundamental legal principles.

There are many areas of kinship between engineers and lawyers. Each has a profession. The lawyer and the engineer are alike in that each is a seeker of physical fact and a user of logic. This alone sets them apart today in a world where pseudo-fact and emotionalism account for more wrong thinking and acting than we, as engineers and lawyers, believe is good for the commonweal.

There is, however, a basic difference between engineers and lawyers which arises out of the difference in the purpose of their respective jobs. The engineer seeks improvement of things physical, for example, bridges, dams, roads, combustion engines, electrical devices, or chemical processes. The lawyer in a free government, on the other hand, works for stability of the relationships of man to fellow man, and man to government and vice versa.

The engineer takes known facts, applies his principles or physical laws—either known or *by him* developed—in an endeavor to achieve something *new and better*, be it a principle, a machine, or a process.

The lawyer, on the other hand, takes known facts, applies established legal principles, often as not enunciated by a jurist long dead, and thereby determines on the basis of what was said, or rather reasoned, yesterday what should be done (by his client) tomorrow.

So, when you pose to a lawyer the question of licensing for the engineering profession, that lawyer begins to look for the established legal principles that apply. And, of course, the older those princles, the better.

Questions Raised

Seriously, the question of licensing raises first the legal principle of the right to work, a right which has recently begotten considerable attention in the particular branch of my profession.

The Fifth Amendment to our Federal Constitution provides in part that "no person shall be deprived of life, liberty or property without due process of law." The Fourteenth Amendment to our Federal Constitution provides in part "nor shall any state deprive any person of life, liberty or property without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws."

These constitutional provisions have been interpreted by the courts down through the years as guaranteeing the right to work.

The principle of the right to work yields, however, in favor of a more important legal principle, namely, the right and duty of the government to use its police power to protect the general welfare and interests of the public. To what extent the government may go in imposing licensing restrictions on the right to work, is the next question. The courts have held that, under the police power, licensing restrictions may be imposed on any business or occupation in order to protect the public health, safety, comfort, or morals.

As Others See Us

"The right to work as guaranteed by our Federal Constitution is one of the promises we have made to ourselves down through the years. Where the effectuation of that promise falls within the jurisdiction of your profession, let steps be taken that it not be lost through obsolescence."

So warns the author of this paper, first presented at the industry-college forum on development of the young engineer sponsored by the American Society for Engineering Education at Rensselear Polytechnic Institute, Troy, N. Y., in looking at engineering registration through eyes of a lawyer.

Licensing imposed on a business or occupation in order to prevent the perpetration of fraud upon the public has also been upheld by the courts as a valid exercise of the police power. It is on this ground that the licensing of auctioneers, second-hand dealers, and bond and securities salesmen has been sustained.

Finally, where legislatures have imposed licensing on certain occupations in which special training is required to perform the work, the courts have sustained such legislation on the ground that the government may, through its police power, protect the public against the injuries that flow from incompetence and incapacity.

Furthermore, the courts have made it plain that unless it is arbitrary or extremely unreasonable, the judgement of the legislature will be sustained on the question of whether a certain business does or does not affect the public interest.

Results of Decisions

As a result, the right to work in numerous occupations has been limited by licensing procedures. Thus, a license is necessary most everywhere today to practice not only medicine, dentistry, nursing, and law, but also to engage in barbering or plumbing, or to operate a beauty parlor.

An understanding of the extent of licensing may also be had from an enumeration of some of the occupations in which it has not been sustained by some courts. Examples are house painting, cleaning and dyeing, paper hanging, and the selling of cut flowers and plants. In these cases the courts have declared that the particular occupations are among the ordinary trades and occupations, harmless in themselves, in many of which men have engaged immemorially as a matter of common right and which, accordingly, cannot be so surrounded with restrictions that an individual might, as a result, be barred from engaging therein.

However, as pointed out above, where a legislature has determined that an occupation affects the public interest and has provided for its licensing, courts have been reluctant to invalidate

such licensing on the ground that there is, in fact, no public interest involved. On the other hand, where licensing statutes have been struck down, the courts have usually pulled out all the stops on the "right to work" chord in writing the opinion supporting the decision.

Does the practice of engineering meet the test of sufficiently affecting the public interest so as to warrant licensing of its practitioners? Before answering this question, it should be noted that there is evidence of disagreement in the professional engineering literature on the matter of licensing. Such disagreement, however, seems to go more to the point of the advisability of licensing from a practical standpoint rather than to the question of its legality.

As to legality, it is clear that the practice of engineering is so related to the general welfare that sound licensing procedures established by the legislatures will be sustained in the courts. In the few instances where licensing procedures for engineers have been held invalid, the courts recognized that the profession was affected with the public interest and nullified the legislation on other grounds.

The very reason for which the practice of engineering was first licensed in Wyoming in 1907 demonstrates its effect on the public welfare. Clarence T. Johnston, who was state engineer at that time, reports that his office was charged with the responsibility for approving applications for new uses of water in the state. In carrying out this responsibility he found that many people who had no engineering training were drafting the plans attached to applications for permits for new uses of water and in several sections of the state were not even making the necessary survey. There can be no doubt that in a state like Wyoming where conservation of water is of paramount public interest, this type of incompetent practice could seriously endanger the public welfare. To prevent this, Johnston drafted and persuaded the Wyoming legislature to adopt the first engineering licensing bill.

Situation Today

Today all forty-eight states require licenses for the practice of professional engineering. Obviously, licensing is here to stay. The real question is how, through the licensing procedure, to best effectuate the principles upon which it is based.

In most cases the examining boards have broad discretionary power both as to granting licenses and as to enforcing the licensing provisions. Here again, courts have not only sustained as constitutional these broad grants of discretionary authority, but have also sustained the boards in the exercise of that power. Therefore, the opportunity to make licensing effective is within the reach of the profession.

For licensing to be effective, vigilance on the part of the profession is necessary in two main areas. First, practicing by the incompetent and unethical, *both licensed and unlicensed,* must be prevented; and second, the conditions for the granting of licenses must be designed to bar *only* the incompetent and the unethical.

In the matter of preventing practice by the incompetent, the engineering profession has a much more difficult job than the medical and legal professions because there is not, in engineering as there is in the medical and legal fields, the channelization or focusing of the practice toward or at a particular point.

For example, one cannot practice any amount of law without finding is necessary to appear in the courts. As a result, denying the unlicensed access to the courts automatically prevents substantial unlicensed law practice. Likewise, one cannot develop any amount of medical practice without issuing prescriptions or hospitalizing patients. Thus, denial of access to hospitals to and refusal to honor drug prescriptions of the unlicensed again automatically prevents unlicensed medical practice in those areas.

This focusing of the practice of law and medicine also tends to expose any *licensed* practitioners who are, in fact, incompetent and unethical so that steps may be taken to revoke their licenses if necessary.

Job Thus Heightened

The engineering profession, lacking this advantage, must be all the more vigilant in preventing practice by the incompetent and unethical. It is understandable that a member of the profession will be reluctant to file a complaint or initiate proceedings that may result in another's losing his license. Nevertheless, if licensing is to be effective some technique therefor must be devised.

To do this disagreeable type of work, both the medical and bar associations have standing committees that have been used to good avail. In addition, bar associations usually have regular committees whose function it is to handle cases of unauthorized law practice such as the drafting of wills and deeds by notaries public and real estate agents who do not have licenses to practice law. Important and constructive work has also been initiated by bar associations with non-legal groups whose work may at times border on or invade the practice of law. Examples of such groups are certified public accountants in certain tax work and life insurance salesmen in estate planning involving the drafting of wills and trusts and the application of inheritance taxes.

Through such efforts compacts have been reached with societies of these non-legal people specifying and prohibiting types of work which would constitute unauthorized practice of law.

Another interesting example of this work was that done by a committee of the American Bar Association and a committee of publishers of periodical information on legal subjects such as the Commerce Clearing House, Prentice-Hall, and the Bureau of National Affairs. These committees dealt with the question of the extent to which the publishers could go in analyzing and commenting on the decisions, new rules, and regulations of government bureaus, boards, and courts without infringing on the lawyer's prerogative of giving legal advice. A complete agreement satisfactory to both was arrived at.

Other problems, however, peculiar to the engineering profession arise in connection with this question of preventing practice by the incompetent. They might be classed as undesirable by-products of the process of limiting practice only to the licensed.

One results from the fact that the consulting engineer, in the practice of his profession, is usually a lot more peripatetic than either the doctor or the lawyer and in his travels he may cross many state lines. He is confronted with the varying licensing laws in the states in which he operates.

The excellent work being done by the National Council of State Boards of Engineering Examiners in urging some degree of uniformity among the state licensing laws is about his only salvation from arbitrary deprivation of his right to work in such states. Since there will be a continuing need for such work, the profession must continue and in-

(Continued on Page 23)

Engineers May Criticize Selves Too Much, Survey Shows

By J. O. GRANTHAM
Asst. Prof., Oklahoma A & M

There is a current belief in academic and professional circles that engineers are concerned only with the technical aspects of their profession, and nothing else. Engineers are continually being criticized, even by their own members, for not being active in political, social and religious affairs. To some extent, at least, this must be true, otherwise, there would not be such a clamor from all sides about the apparent weaknesses of the engineer.

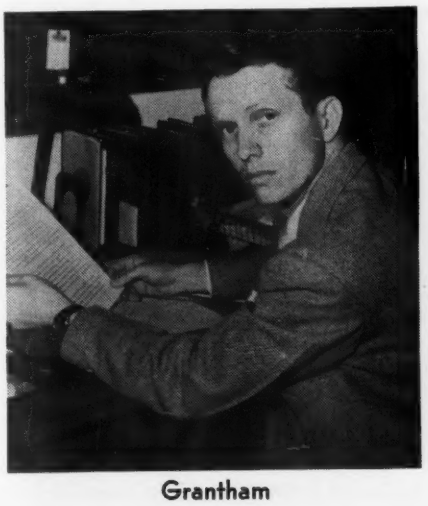
It must be said in defense of the engineer that usually his work is such that he can to a large extent remove the human element as a factor in the solution of his problem. Analyzing the capacity of a boiler, designing a transmission line, or planning the strength of a bridge can be accomplished with little worry about the human element. Thus the average engineer doesn't feel the need of social or political activity as an adjunct to his business as keenly as does the lawyer, doctor or business man. Since social and political activity aren't as necessary, apparently, for the everyday solution of engineering problems as they are for the problems of the lawyer and business man, naturally he isn't as likely to participate as are his colleagues in other fields.

In recent years, however, certain engineers with a sense of moral responsibility for the use to which their labors are put have come to realize that only through active participation in the affairs of men can they have any control over how their talents are to be utilized. They have seen machines built for relieving human drudgery used for human destruction; they have seen stupid squandering of public funds due to improper or complete lack of engineering analysis; and they have seen legislation detrimental to the health and welfare of the public passed by legislators not familiar with the engineering facts. As a result of all these factors, far-sighted engineers have agitated and demanded that their colleagues become active in human affairs and thus have a hand in shaping their destiny.

The main cry for engineering participation in social and political affairs has centered in organizations composed of registered professional engineers. These engineers, who have been recognized by the state as being particularly qualified to serve in the community interest, through the efforts of their respective state societies and the efforts of the national organization, have continually worked for needed improvements in the activity of all engineers.

Poll Reported

In Oklahoma, the Oklahoma Society of Professional Engineers is the focal point from which stems most of the political and social activities of the Engineers of the state. At the recent state meeting of the Oklahoma Society of Professional Engineers a survey was made in an attempt to ascertain the activity and leadership of OSPE members in religious, social and political affairs of the state. The survey was quite elementary, but results were obtained which are certainly surprising and may be viewed with interest. There were approximately 400 engineers registered at the convention and of that group a total of 94 were polled. The percentage was large enough such that assumptions might be made about all those in attendance at the convention from trends indicated by the poll.



Grantham

The usual public impression of an engineer is one of a gruff, didatic, worldly, and individualistic man who is concerned very little with the spiritual values of life. Consequently the results of this poll are quite interesting—60% of those polled at the convention attended church regularly; 29% occasionally; and only 11% rarely attended church. Moreover, 84% of those questioned at the convention were members of some church; and of those belonging to a church, 62% held responsible offices in the church, such as serving on boards of trustees, deacons, aldermen and Sunday school superintendents.

What conclusions can we assume from this data? We can certainly say that the average member of OSPE is a man who is concerned with the spiritual values of life and does something about it. His profession might emphasize the material side of life quite extensively but his sense of values goes deeper than that and rests upon a belief in God and consequently human dignity. It is little wonder, then, that he is critical of himself for not serving his fellow man more. Further, since 62% of those belonging to a church held positions of responsibility in the organization it would indicate the engineer is exerting extensive leadership in his local church or parish and is far from the skeptical, aloof individual sometimes pictured.

Sports have been considered as being fairly popular with engineers. Since 65% of the members attending the OSPE convention indicated an active interest in sports, this impression was quite correct. The five sports indicated as being most popular for engineers might very well hold the same popularity nationally with men of professional level. Fishing was most actively participated in with hunting, golf, bowling and tennis following in that order. Billiards had suprising strength in this field. A very large percentage of the 35% who evidenced no activity in sports did, however, have a hobby. This emphasizes the fact that the average member of OSPE, as evidenced by

the poll, has some relaxing interest outside of his work which should make him a more well-rounded individual.

Participation in the fine arts such as music, drama and book clubs, might be considered as a point for criticism of OSPE members. Only 9% were interested to any degree in activities such as this. Whether this is any less than would be found in other professional groups can only be speculated. The fact that opportunities for participation are very small in this section of the country might be the main reason for this low percentage. However, those who did participate had a variety of interests. First trumpet in the town orchestra, member of Book of the Month Club, member of historical societies, drama club and human relations club were all representative of this group.

Sociability Figure

A real indication of the sociability of the members of OSPE was the fact that 22%, almost 1 out of every 4, of those polled belonged to the country club in their community. The country club being usually the center of social activity in any city would indicate that OSPE members are frequent participants in the social activity of the community.

In an effort to determine the extent to which members of OSPE aligned themselves with various fraternal organizations, it was found that 62% of the group were members of some fraternal group, 80% of which were members of the Masonic Order. This would mean that 50% of the group as polled were Masons.

The question was asked once again about offices or positions held in social affairs in an attempt to ascertain the leadership exerted by OSPE members in this vital part of a man's life. In this case 25% of those belonging to social or fraternal groups held a major office. One in 4 evidenced strong leadership. That is a good batting average.

Hobbies? Everyone, almost, has a hobby, and the OSPE members certainly indicated this fact —65% indicated an avid interest in some hobby. Everything from apiary to children was indicated as a hobby. Photography led the list with 13 people indicating such activity. Sports, shopwork, OSPE, family and books all followed in that order. One interesting thing to note was the large number of hobbies which were of a social service nature. Education, family, people, OSPE and social service were all mentioned and their service implications cannot be denied.

Does the engineer have any interest in the affairs of his community? Is he a conscientious citizen realizing that no community is better than the people that compose it? The following results are interesting—45% or nearly 1 out of every 2 was active in the Chamber of Commerce of his respective community and out of the group belonging, 45% had held or were holding positions of responsibility in the organization.

Civic clubs such as Rotary, Lions, Kiwanis, and American Legion were joined by 1 out of 3 of the OSPE members; and of the group belonging 66% held offices of importance in the clubs. This would indicate a high degree of leadership exhibited on behalf of the civic club by the engineer.

Civic planning activities certainly are areas where the training and experience of the engineer may be used most effectively. It is here that his special knowledge of construction, hydraulics, electricity and sanitation may be put to its most valuable use. How do OSPE members over the state of Oklahoma feel about participating in planning activities? Well, 38% were contributing time and effort to civic planning programs.

The civic spirit of OSPE members is evidenced in another manner. The children of the community were the concern of over 1/3 of the group. This is evidenced by active participation of 36% of the group in Parent-Teacher's Association and 32% in Boy Scout or Girl Scout activity. The educational welfare and physical, mental and moral interests of the youth of the community would be served well if all professional groups were as active as engineers in looking after the children of a community.

Political Activity

The political activity of professional people is always a controversial subject. Whatever may be the feeling of one discussing the subject, nevertheless, I think all are agreed that our most capable leaders are needed in politics and government. In the past professional people, especially engineers, have participated far too little in such a vital element of our society. From simply voting to actually holding public office, people have a certain indolence, lack of interest or apathy toward things political.

The results of the poll concerning political activity are quite revealing in light of the engineer's reputation for complete lack of interest in things political—99%, or only 1 person out of the 94 questioned, failed to vote in the last general election. Now this is a surprising record for any group—showing an awareness of political responsibility which is certainly to be commended in any organization.

However, this record was not adhered to when an effort was made to ascertain how many of those polled at the conference had campaigned actively on behalf of some political candidate. Sixteen per cent had at one time or another performed such a function, while another 10% had run for office themselves. Such offices as the state house of representatives, county engineer, county surveyor, county commissioner and city offices were the ones for which engineers had run.

The final question, in which each man was asked about his feelings as to whether engineers participated sufficiently in public affairs, was indicative of the way most engineers feel about themselves. Nine out of ten were of the opinion that engineers did not participate sufficiently in political and civic affairs. However, the results of this poll are much more optimistic as far as members of OSPE are concerned than might be expected.

The final summary might well be along the theme "Things are better than you think." Is the average engineer in Oklahoma a skeptical anti-religious person? No—84% belonged to some church group. The national average is a little less than 50%. Is the average engineer in Oklahoma a shy, backward, anti-social introvert? No—22% of those polled at the convention were members of country clubs indicating a marked ability to get along with people and a strong liking for group activities. Is the average engineer in Oklahoma completely uninterested in the political affairs of his State and Nation? No—89% voted in last general election. I challenge any group, professional or otherwise, to beat that performance.

And above all the poll indicated that Professional Engineers of Oklahoma have not only actively participated in numerous religious, civic and social activities but have also been leaders in the groups to which they belong.

It is said that each man is his own worst critic. Possibly we have been too critical of ourselves. A survey such as this indicates that we have much for which we may well be proud.

Engineer Gets Call--

Slide-rule Mind General Assigned Long-range Bomber Direction

Appointment of Lt. Gen. Curtis Emerson LeMay as chief of the United States general strategic air command probably went unnoticed by most members of the engineering profession.

It shouldn't have—for the man who by that appointment was placed in command of America's long-range bombing fleets is an engineer. He took his slide-rule mind into the Air Force with him after graduation from the engineering school at Ohio State University. And as a result, his most daring attacks during World War II were cooly calculated with charts, graphs and figures, balancing possibilities of success against risks of loss.

In his new post, he has a "simple" assignment: "If World War III starts, win it immediately."

That's the kind of assignment any engineer would love—their success in doing the difficult in very little time, and the impossible in only a little more, during World War II proves that. And it's an assignment that an engineer has.

LeMay is convinced that to do his job, he's going to have to be able to hit any enemy "first with the most." Officially, his orders in the job he now holds are to keep America's long-range aircraft "capable of bombing an aggressor's homelands, smashing his attack at its point of origin and destroying his capacity for war." That he'll make good is indicated by the success of the Berlin air lift, which LeMay, as chief of the U. S. Air Forces in Europe, organized and put into operation to counteract the now ended Russian blockade.

One of the strongest proponents of the power of strategic air war, the 42-year-old general is convinced that if you are stronger than the other fellow, he can't attack.

"Any nation that cannot control the air above it in war cannot long survive," he declares. "An air attack cannot be stopped once it is started. But we propose to have an air fleet strong enough to stop any attack in its incipiency."

LeMay knows from solid experience whereof he speaks. He's credited with having had more experience than any one else on earth in high field command of long-range bombardment. In two years with the B-17's in Europe he devised the bombing tactics which became basic throughout the war-time AAF. Then he took on the job of bossing the B-29s which battered Japan into submission, first from China bases and then from the Marianas.

Background of Experience

One of the youngest three-star generals in the armed forces, he rose from the rank of lieutenant in 17 years. He became a flying cadet in 1928 after graduation from Ohio State, won his wings as a fighter pilot the following year, then switched to bombers and pioneered in long-range aerial navigation studies. During the war he was all business—as one writer put it, "he treated men and machine alike with the engineer's impersonal regard." Once invited to dine with a group of colonels, LeMay is reported to have turned down the invitation, explaining that "a man should have dinner only with his friends, and the commanding general has no friends."

Sliderule General

General LeMay

With engineering tenacity, he took his first combat assignment as commander of a B-17 group as the opportunity to devise the staggered, stepped formations which proved to give the bombers maximum efficiency and greatest protection. Another innovation was his insistence on pattern bombing. Instead of letting each bombardier sight on the target under that system, the bombardier proven most accurate did the sighting for the whole formation.

Again, when his B-29s were suffering heavy losses from Japanese anti-aircraft fire at high altitudes, LeMay used an engineer's skill and ordered the big ships to fly in at low levels. Jap gunners were so confused that most of the ships got home. Like many engineers, he is a perfectionist to the nth degree. When he discovered, while in Europe, that B-17s were missing targets because they were paying too much attention to flak and fighters, he ordered a stop to evasive action over an objective. He went out and proved at the controls of a plane heading a formation that his cold detachment, gambling possible heavy losses against changes of great effectiveness, would pay off.

Rigid training is one of the keys to success of the units he directs. When days appeared during the war when combat flights were not made, his crews made practice bombing runs on uninhabited areas.

Like many engineers, LeMay is not noted for his constant readiness to join in idle chit-chat. Asked at a reception by a woman guest why he stood by quietly and said nothing, he informed her of his belief that "when you talk all the time, you don't learn anything." Like many engineers, he makes blunt statements that may lead to criticism, but never leave a doubt about what he thinks.

LeMay arouses strong sentiments among the men who serve under him—respect, admiration and loyalty—but not the affection which many leading military men can win.

"It's hard to love a human slide rule," one lead bombardier from World War II said. "He's rough, he's tough, but he gets results!"

. . . On the Professional Estate

Engineers quite often assemble in groups to examine their problems, but only rarely, it seems, do they stand off as individuals and examine themselves and their relation to society. This is a usual characteristic of specialists.

So says Charles E. Wilson, president of General Electric Co., in "The Professional Estate."

It would be foolish, he points out, to attempt to evaluate the relative importance of the doctor, the lawyer, the economist, the teacher and the engineer—to name just a few—in our present scheme of things. That is not necessary to make the point. All of us have our work cut out for us, and it is specialized and important work in a highly specialized world, at a critical stage in the development of civilization. But certainly the one overwhelming characteristic of this modern world is its tremendous material achievement and its vital dependence upon technology and science.

> **We have been caught up in this century in a whirlwind of new knowledge and the application of that knowledge, and it has left us breathless and trembling. With the dropping of the atomic bomb, we were suddenly shocked into the realization, an awesome realization, that our human capacity for intense specialization had gotten tragically ahead of our human capacity for thoughtful adjustment. Hiroshima was, in a sense, the final and rather staggering piece of evidence to prove, if more proof were needed, that the engineer-scientist of today stands squarely in the center of the stage.**

He is that member of the professional estate most responsible for the nature of the world in which we all live. He has achieved distinction in the practice of his specialty, and he must solemnly consider his duties and obligations to society.

The engineer-scientist, as the foremost professional men of the day, must leave off being mere bookworms and lead the way back to a balanced and integrated society.

It is one of those strange quirks of human nature that most men are not at all embarrassed or reluctant to discuss with their fellows the day-to-day technical and professional problems in which they are engaged, but the more their minds run to shop-talk on any plane, the more tongue-tied and thought-tied they become where a general question of morals or human behavior is posed. And yet these are very simple matters. No group or organization operates or can operate in the rare atmosphere of science and technology alone. Once they could, perhaps, but not today.

Their members are not machines but men. By banding together they have become greater, and the sum is more significant than the parts. Through association, engineers have increased their professional stature and taken upon themselves, perhaps unconsciously, the duty to strengthen and support the society of which they are a part.

Foresees Obligations

You, as engineers, are bound henceforth not only to understand the technological progress which you are achieving in your specific ways, but you must understand the kind of society which supports that progress and, in turn, is borne forward on its shoulders. What are you doing . . . not as bridge builders and physical scientists, not as experts on distribution transformer and secondary conductor economics, but as social and moral scientists and engineers?

You must, I am sure, as you consider these questions of your professional stewardship, admit that it is no longer possible for you just to confine your efforts to engineering. The peculiar forces which you, as engineers, are dealing today will make it extremely difficult for you to limit yourselves, in this modern world, to technical matters. You have come too far, you and those who preceded you, and you have powerfully affected and shaped the lives and destinies of too many millions of people to deny your responsibility now.

Brick by brick, step by step, computation by computation, you have with your own hands and brains built a great structure and equipped it with the machines and devices which have made American living and working standards the highest in the world. So intensely have you concentrated on your specific tasks that you probably have not been aware of the magnitude of the whole job, or your own intimate connection with it.

Then what are the things that we ordinary citizens expect you engineers to do that you have not done before? What is it that we now feel we have a right to expect from your professional estate?

A New Feature

In the flood of engineering publications which come into NSPE national headquarters in Washington are many non-technical articles of vital interest to all professional engineers. Many are contained in the technical society magazines, where members of other branches may fail to see them. They come, too, from such a wide range of magazines that the average engineer couldn't hope to keep up with them all.

As a service to its readers, THE AMERICAN ENGINEER will, at regular intervals hereafter, digest as many of these articles as space permits. In so doing, it will credit the magazine in which the articles appear, making it possible for any of our readers whose curiosity is aroused by the digest to find material in which they have a specific interest. We hope that the magazines from which we digest articles will accept our action as a sincere salute of thanks for fostering the professional concepts for which NSPE long has stood.

In your preoccupation with the sliderule you cannot safely leave to others—to the economists and politicians and lobbyists—the larger job of defending the way of life which was made possible by your own contributions. You have no right to delegate the duties of citizenship simply because you have a test to run or a specification to write. You have no right to turn away from such problems as education, taxation, government reorganization, national security, civil rights, labor and management or atomic power development simply because they may involve you in controversy and take your time. It is quite true, of course, that no man today has the right to turn his back upon these things, but the professional man has a particular obligation to society to understand and to act.

The day is indeed past when the professional man could delegate his understanding and his action, in a sphere not specially his own, to some selected advocate, or else neglect it altogether. When Communism jumps at you out of every headline and from around every familiar corner, the situation of even the average man becomes a little uncomfortable, and that of the professional man may be particularly difficult. Here again there must be a great temptation for a true specialist, such as an engineer or a scientist, to withdraw into the protective and respectable cocoon of his immediate task and leave to others so inclined the vigilant defense of the republic. Yet to do so is to assume the spurious mantle of a protected class. The true professional man, if he values his integrity, will not compromise such an issue. He cannot, it seems to be, if he wants to keep his self-respect.

Today you stand well at the head of those aggressive and important forces in America which, by their very achievements, have added to their responsibilities. The entrance requirements for membership in the professional estate are nowhere near as rigid and difficult to meet as are the requirements for maintaining that membership, and that is as it should be. One of your abiding characteristics must be "confidence in the unsearched might of men."

(From March, 1949, Electrical Engineering)

. . . On Oak Ridge -- A Dilemma

It is less than ten years since atomic fission became a reality to scientists; it is less than three years since atomic fission became a deadly reality to hundreds of thousands of people and a cold apprehension to the rest of the world. The science and engineering that built this giant have been acclaimed. The reasonable assumption that now the forces of man would direct the forces of Nature to our greater good has been our hope for almost three years, but the route has been rocky and the accomplishments, while substantial, have been disappointing.

Robert M. Boarts, head of the chemical engineering department at University of Tennessee, gives his views as to why in "Oak Ridge—The Symbol of Our Unresolved Dilemmas."

Technical skill for the task was assembled at the close of the war. If it is not there now, if the succession of changes and counterchanges of policy, direction, operators and objectives have delayed the work, then we can well examine the extra-technical aspects of this nuclear program to find what we might learn for our future welfare.

Does the trouble lie with our form of government? Probably; and we cannot have it otherwise. Every man an expert, we maintain, as we elect our fellow expert to solve our problems from within himself and by his good sense. If our system permits unthinking men to damage this work of unusual importance, then we can repair the damage safely only within the framework of the same system.

Are those who direct the program incompetent? By usual standards no. The administration of a project such as nuclear energy involves particularly ideas, men and means. The matter of means is not altogether at the disposal of executives; budget considerations place it on a legislative level. The personnel factor is more important. It has not been solved on the Manhattan project. The loss of good employees has been continuous.

Does our desire for efficiency trip us? Many of the decisions which have distressed the Oak Ridge personnel have been made in the name of efficiency. These decisions call for consolidation of programs, formal assignment of personnel to specific duties and more coherent organization. This is the technique for industrial development and works well for development. Development is what its name implies—it makes useful the ideas of research. Atomic fission was the product of university research conducted without regard for the direction of application.

Most research scientists will not work in this atmosphere and they move on. Most research engineers try to work in this atmosphere and that is why there has been so little engineering research done—they are converted to development engineers.

The haste and search for efficiency have already militated against the flow of new ideas in atomic fission.

(From May, Journal of Engineering Education)

. . . On Bridges of Knowledge

In whatever area we live and work, we need what literature, art, music, history, philosophy and religion can give us. For man needs not only knowledge and skills but a sound sense of values and ample sources of inspiration. With these he can become a human dynamo; without them he is too often a machine stuck on dead center.

So declares James P. Baxter, 3rd, president of Williams College, in "Bridges of Knowledge." Only a truly liberal education can supply a sense of values and ample sources of inspiration, he insists. General and specialized education are not at war but are complimentary. There are important bridges that must be built and kept in good order, and they will never be constructed save by those imbued with the spirit of liberal education. These are the bridges across the gulfs which yawn so alarmingly between the three vast areas of knowledge which we often describe as the humanities, the social sciences and the natural sciences.

But the traffic over these bridges must not be one way, for the scientist and the engineer have great need of ideas imported from the areas of the social sciences and the humanities.

A great deal of the success in solving the problem of combining general and specialized education for engineers depends upon the climate of opinion in the place where the education is offered. In all of the engineering schools with which I am familiar, the departments of mathematics and of physics, to take but two examples, have an immense prestige, comparable to the position of the football team and its coaches at Notre Dame. I would not have it otherwise, but what does concern me is the prestige of the humanities and the social sciences in these engineering schools. What I want to know is how important do the students, the faculty, the alumni, the parents and the prospective employers think are these courses in the humanities and the social sciences.

(From July Technology Review)

. . . On Generalizing Education

Function of engineering schools on the over-all American educational scene is to educate specialists who are able to put science to work for useful purposes. If we are to do this job adequately, I am convinced that we must provide more general education in the undergraduate curriculum.

So declares James R. Killian, Jr., president of MIT, in the article "Educational Goals."

If we are to attain that goal, we can anticipate less and less specialization in the undergraduate years. While preserving the motivation that comes from having specific courses of study, such as electrical engineering or mechanical engineering, in the undergraduate program, we must anticipate pushing into the graduate years some of the more specialized work.

Our undergraduate subjects can thus be devoted to the basic content of engineering science. I would define the undergraduate engineering program of the future as one that provides a general education with the emphasis on science and engineering, rather than a specialized training with a small amount of general education.

As we seek to broaden the education of the specialist, we must at the same time be careful to avoid overscheduling and overfeeding him. The engineering schools have always been proud of their reputation for requiring hard work of their students. I hope they hold fast to that reputation. But students need not only meet rigorous requirements; they need also opportunities to reflect, to develop the intellectual maturity that comes only from self-education under adequate stimulus. The students who are studying to be professional men need time to be resourceful, to develop judgment, to acquire a broad margin to their careers. They need time to avoid what Veblen called "trained incapacity."

(From May, Journal of Engineering Education)

. . . On Professional Development in Industry

Master keys to professional development of young engineers in industry are embodied in two words: encouragement and recognition. The young engineer needs encouragement if he is to use his abilities at the highest possible level and is to develop his potentialities through experience and education. He needs to be given responsibilities, but no faster than he is able to handle them—and to progress at the maximum rate commensurate with his ability, he must receive recognition for his accomplishments.

So say J. C. McKeon, manager of university relations, and Guy Kleis, manager of student training, of Westinghouse Electric Corp., East Pittsburgh, Pa., in "Professional Development of the Engineer in Industry."

They propose as a charter for professional development for industrial leaders and engineering educators Aristotle's declaration of more than 2,000 years ago "All men desire by nature to know." That statement is just as true today as it was then, and its acceptance by industrial leaders and educators will help them point the way toward development of leadership qualities and a professional viewpoint.

(From July Electrical Engineering)

. . . On Swinging Pendulums

In engineering education, as in other fields, it would appear that history repeats itself and that the pendulum swings from one extreme to the other. A century ago, the emphasis was on a broad liberal education. Then, with the increase in scientific and professional knowledge, it switched to highly technical education. Now it is tending in the other direction.

Harold E. Wessman, dean of the college of engineering at University of Washington, Seattle, explains the trend and some of the reasons in "Pendulum Swings Toward Broadening of Engineering Education."

Almost every engineering school in the country has studied and revised its engineering curricula and reappraised its science and technology content. A decided effort is being made to give more effective instruction in English, public speaking and technical report writing. Courses in literature and government have been introduced. Some familiarity with the historical and social background of our contemporary civilization is being achieved. More and more students are being encouraged to continue into graduate study and research. Some schools—about three per cent of the total—have instituted a five-year program, but it is not justifiable to conclude that there is a definite trend along these lines.

In including subjects other than technical in the engineering curricula, stress should be laid on the need for the highest type of teaching ability. Only too often do teachers consider it a penalty to be assigned to an engineering section, or second-rate instructors whose only interest is in obtaining an advanced degree given supervision of professional students in their non-technical courses. Science and technology must be dominant in engineering education. The constant nourishment of scientific and technical achievement is the only means of preserving the American heritage. This can be done in engineering education while at the same time stimulating intellectual and moral interests which will prevail in the years following graduation.

(From April, Civil Engineering)

. . . On U. S. Engineers Abroad

More than a few young engineers today are considering careers in foreign fields. Today the number of engineers required and working abroad is greater than ever before. Since the turn of the century, opportunities offered by the foreign field have increased as the world gradually entered into an era of national interdependencies.

Lloyd J. Hughlett, editor of McGraw-Hill International Corp., New York, declares in American Engineering and Industry Abroad, that engineers today will go abroad and accomplish feats which will immortalize them in the annals of countries in process of development. The need still continues for engineering facilities to exploit the natural wealth of countries; but the need is also being extended to educate peoples in the skills of efficient production and in the economics of management as they become self-sufficient, well-clothed, well-fed nations capable of participating in world trade.

The author draws this picture of engineering opportunities abroad:

American construction engineering, largely based upon civil engineering, generally precedes the export of capital industrial goods, while U.S. labor and management skills accompany their installation and use in a developing factory system. Industrializing countries have already employed our engineering to construct or supervise the construction of their public works programs.

At least 90 per cent of the income derived from U.S. engineering in the foreign field today is routed through the large contracting firms employed to handle the public works programs of countries abroad.

The engineering required for power-plant design and construction, petroleum refineries and chemical plants comprises an increasing percentage of foreign engineering activities. Engineering firms handling the largest share of business abroad in these fields are staffed with engineers in these specialized branches of engineering, work with the client in conceiving and planning a project, carry it through its de-

sign and finally contract for its construction.

The consulting engineer has generally played a very limited role in the foreign field. Unless he has been retained by some large U.S. company to supply a highly specialized service on a foreign project, his services simply have not been in great demand by foreign companies or governments.

There is considerable promise abroad in the field of management engineering. Unfortunately, few foreign companies as yet recognize the value of this service and even more are not aware of its existence.

The importation of our management skills is the catalysis to accelerate industrialization and result in efficient and economic productivity.

(From July, Mechnical Engineering)

. . . On Tomorrow's Executives

Civilization has advanced, down through the years, because men have "made things." And, by and large, the chief makers-of-things have been those mechanically-endowed individuals we have come to know as engineers. They have become the real architects of the good living we accept and enjoy today as a matter of course.

This modern engineering development in partnership with modern business methods will continue to make the United States the focal point of progress. The advancement of engineers into high administrative posts was to most engineers a difficult and distasteful task because they were unprepared by training—and usually by temperament as well—for this dealing with people . . . rather than with things. Nevertheless, the trend has continued until within the last year an independent survey showed that one-third of the largest corporations in America are headed by graduate engineers.

Thus does Walter Evans, vice-president of Westinghouse Electric Corp., trace the rise of engineering leadership in industry in "Tomorrow's Executives." The men who have made that rise have five special attributes—an ability to express themselves clearly and well; a normal curiosity regarding economics, finance, law, psychology and other non-engineering subjects; a willingness to make the logical and reasonable compromise with perfection which day-to-day business requires; a ready understanding that income must exceed outlay; and above all an ability to get along with their contemporaries and at least to understand their competitors.

Accepting the fact that some engineers make good administrators, Evans then sets out to find out why more engineers aren't in top management posts. The answer lies deep-rooted in the personal traits of character necessary for a man to be an engineer; and in turn, in his training, his choice of employment and in the general environment which these things produce. Greatest weakness of the educational system for engineers is the failure to provide good, solid, academic fare which will guarantee a good engineering education PLUS the broader business background which will enable graduates to qualify readily for broader horizons.

By its very nature, engineering attracts individuals who too frequently are persons of precise mental habits. Engineers deal in exact sciences. Two lines bisected in the same way produce the same angle today . . . yesterday . . . tomorrow—and the engineer is inclined to develop his personality in the same ordered perfection.

(From July, Bent of Tau Beta Pi)

. . . On English Education

England, a highly industrialized country with a population one-third that of the United States, has an engineering college population roughly one-hundredth that of the United States. How does the country get along? Because British universities supply only a small fraction of the technological personnel needed by industry—the remainder come from technical "colleges," in part-time and evening classes and through correspondence courses.

Charles Susskind, of the graduate division of Yale University's school of engineering, examines ("Engineering Education in Great Britain") the British engineering educational picture in the light of recurrent themes in the report of the President's Commission on Higher Education that education on the professional level should be made available to a greater number of students. Such a policy, as applied to engineering education in America, has been subjected to criticism ever since the engineering college ceased to be a "school of industrial vocations" and adopted the collegiate plan of organization.

Britain's technical colleges, Susskind reports, afford a wide variety of courses for the industrial vocations, as well as for the trades. They grant no degrees, their entrance requirements are lower and they can accommodate many students who, from economic considerations or otherwise, could not remain in secondary schools long enough to reach the matriculation standard. Attainment level of some of these institutions compares favorably with that of many American universities. In some cities they are tied more or less informally to local universities, and the exceptional student is often encouraged to proceed toward a degree.

Another standard of attainment is membership in one or more of the professional societies. A measure of the role played by such bodies in Britain is the fact that most students of law, medicine and other well-established professions earn the right to practice by passing the examinations of their respective societies, without ever having attended a university at all. This system has quite naturally extended to the younger engineering profession.

Usual residence requirement for an engineering degree—at the bachelor's level—is three years. Virtually all humanistic studies are excluded from the British curriculum on the principle that they should have been concluded in secondary school. A high degree of selectivity of students is practiced.

British industry and government are well satisfied with the dual system of engineering education. They are content to allow the universities to continue in their leisurely, unhurried task of producing the type of man who will find his place in research, education, government and the planning side of industry; technicians for the operating side of industry are more profitably prepared at the technical institutions having curricula which are readily adaptable to industry's local needs, and generally show a decidedly more practical (i.e. vocational) approach to engineering.

(From May, Journal of Engineering Education)

. . . On Engineer Internships

Of all the professions, engineering is probably most difficult for the public to differentiate from associated trades. The difficulty may arise from the nature of the materials with which the engineer works. Where other professions are concerned with relations among people and the physical well-being of people, engineering is concerned primarily with materials and products used by people to improve their standards of living.

We quite readily accept the idea that other professions must require a period of internship. On the otherhand, we often expect an engineering graduate to solve practical problems immediately without a period of gaining experience and adjusting theory to practice. To this extent, industry has regarded him

as an accomplished technician rather than as an engineer-in-training.

This mistaken practice has helped to destroy whatever professional consciousness the engineering graduate has developed in college and it delays and often prevents entirely his ever becoming a professional engineer.

K. B. McEachron, Jr., manager of the technical education division of General Electric Co., makes that assertion in "Internship for the Engineering Graduate."

Industrial organizations have come to take two views of the engineering graduate—one, that he is merely a technician, in which case industry has little interest in the attributes which will determine his success later as a professional engineer; and too, that every engineering graduate hired is a potential chief engineer, in which case the college training is considered an opportunity to teach a man how to think, not what to think.

If employers of engineering personnel never forget that the engineering graduate is not yet an engineer but with wise counselling and adequate training and experience he may become an engineer, we shall not only have more truly professional engineers but we shall have helped also to solve one of the most difficult problems facing engineering colleges: which are more important, specialized courses or fundamental engineering principles.

Importance of Internship

Internship is even more necessary than formal college training. Many have risen to prominence in the engineering profession with little or no formal education but no one has ever become an accomplished engineer without experience—without a period of internship. In fact, whether we like it or not and whether we plan it or not, there will be such a period in the career of every engineer. The only freedom of choice then lies in what industry does with the graduate during this time.

Objectives of internship for the engineering graduate and the period it includes are:

1. During this time, the engineering graduate should gain that training and experience which it has not been possible for him to obtain in college and to do so in such a way that at its completion he assumes the full responsibilities of a professional engineer.

2. More important than any other single factor is the relationship between the graduate and the recognized engineer. There is no substitute for apprenticeship, in the broadest sense of the word, in engineering as well as in mechanical trades.

3. Although the time required to achieve full professional status following graduation varies among individuals, three to five years is an average.

4. Primary emphasis in industry must be upon the application of engineering fundamentals—primarily emphasized in college—to actual engineering problems. The heart of this period of internship must be industrial experience.

To equip the young graduate more adequately for his future responsibilities, industrial experience must be supplemented in four ways—the engineering graduate should be introduced, properly and carefully, to his company, his community and his professional society; an opportunity should be provided for the graduate to continue his technical education; attention should be given to enlarging areas of understanding; and adequate guidance and counselling should be available to such employees.

(From June, Electrical Engineering)

. . . On Defending Industry

American management and its conduct of free enterprise is on trial at the bar of public opinion. Seven years of rising real wages has set a standard of performance that will not be easy to maintain. Yet if we do not maintain it, the free enterprise system may not survive.

The competence which we can give to the prospective young management man today will largely determine the status of industry tomorrow. In this future mold, the young engineer is sure to play a predominant role. It is he who will largely determine the potential "rate of economic progress."

So says Lawrence A. Appley, president of American Management Association, New York, N. Y., in "Opportunities and Responsibilities for the Young Graduate Engineer in Industry."

When we examine the nature and causes of increasing productivity in the past, it becomes apparent that they can be traced, in great measure, to improvements in technology which have more largely contributed to rising productivity and increasing standards of living than any other managerial activity. That is the great potential upon which we must draw in the future, which we can use more effectively than we have in the past through the application of good human relations. Engineers will have to perform a strategic function in saving the economy during the adverse tides of the business cycle.

Management must continue to recognize and fulfill its obligation to the engineering profession.

(From February, Mechanical Engineering)

. . . On Engineers in Shells

I could not imagine a gathering more important to Canada than a society of engineers. No country in the world owes so much to the men who pushed across the steel, who conquered and tamed our rivers and penetrated deep into our northern hide.

No country stands to gain so much from the engineers as does this unlocked treasure house of the north. If the engineers of Canada decided to cease work tomorrow this whole country would be paralyzed. The great turbines would stop . . . the water of sewer and energy would lack the guiding hand. Transportation would be reduced to foot locomotion. Just look around your own room in your own house. Nearly everything you touch had to be designed on a drafting board.

Thus did John Fisher, the Canadian Broadcasting Corporation's roving correspondent, report on his attendance at the 63rd annual convention of the Engineering Institute of Canada in Quebec in a nationwide broadcast.

They are the builders . . . the nation is in their debt. Tomorrow we await their genius and gifts only if they will SHARE THEIR STORY. I quarrel with the whole Engineering Institute of Canada. You have not shared your story. You have been consultants, not leaders. At Quebec you were tourists, not explorers! You can do more for us tomorrow than any other group in the whole country. That is my point . . . that society today is in such a mess that you can no longer be content with your posts at the drafting board. Are not the problems of democracy so tight and complex that the engineer must emerge from his drafting board and plan for society?

Sure, the very nature of his profession demands the traditional sureness and caution of science. He can still retain his caution, but, from his knowledge he can give us light . . . he can excite us and build up public pressure for the very things he knows should be and can be done. By talking about them now—by sharing the story—the engineer will stand a greater chance of seeing the fruits of his dreams.

LEGISLATIVE REPORT

Fixing of reasonable standard charges for personal services does not constitute a violation of the Sherman Anti-Trust Law. That is the significant ruling of the United States District Court for the District of Columbia in finally dismissing the government action against the National Association of Real Estate Boards, and sixteen individual realtors.

The government case was filed in the summer of 1947 in the double-barrelled form of a civil suit and a criminal indictment. The government contention was that the fixing of real estate commissions constituted a violation of the Sherman Act because it eliminated competition between realtors, increased commissions to brokers, and restricted legitimate real estate activities. The criminal phase of the case was dismissed last Summer when a different federal court in Washington found that the Sherman Act was not applicable to the activities described in the indictment. (See AMERICAN ENGINEER, December, 1948.)

The significance of the real estate case to the engineering profession lies in the relationship between the principle of minimum real estate commission fees and the various state and local schedules of minimum fees recommended by local groups of professional engineers. While an adverse ruling in the real estate case would not have been conclusive with regard to engineering fee schedules in view of the different facts and circumstances, such a ruling would have put the engineering schedules under at least a cloud of doubt.

But under the present ruling, coupled with the strong ruling of last Summer when the criminal case was dismissed, it is now clear that such activity is outside the scope of the Sherman Act. The current ruling, by District Court Judge Holtzoff, states that even under the latest Supreme Court decisions that price-fixing is *per se* an unreasonable restraint of trade and hence illegal, the principle is not applicable in connection with charges for personal services.

"There is a vast distinction in principle between fixing the prices of commodities or articles, on the one hand, and prescribing charges for personal services, on the other hand," the court said.

Another Effect

Also settled by the District Court decision is the contention that the principle and philosophy of the Clayton Act, which declares "the labor of a human being is not a commodity or article of commerce," applies as well to personal services as to manual labor.

"The term 'labor' as used in the Clayton Act is not limited to the work of manual laborers or of mechanics. It comprises intellectual labor as well. Neither is the term restricted to the work of the poor or the needy. Thus there are labor unions of mechanics, of clerks, of teachers, and of airplane pilots. Many other similar instances might be adduced. All of these organizations fix wages or salaries to be charged by their members. Such activities have never been held to form violations of the Sherman Act *per se*."

The court found no case in the federal courts that has applied to personal services the rule that the fixing of prices of commodities or articles is *per se* an unreasonable restraint of trade.

"To contract for one's personal services is a fundamental right of every man. For men to combine to regulate the compensation to be charged by them for their own services is also entirely legal," the court stated. "While this right has been generally recognized in respect to persons who toil for wages or salaries, no reason appears discernible why it is not equally applicable in principle to those persons who work for commissions. The instant case appears to be the first occasion in the history of the enforcement of the Sherman Act that the government has challenged this right."

Judge Holtzoff stated that it is a matter of common knowledge that rates of commissions for brokers' services of various kinds have been openly prescribed by numerous organizations of brokers for a great many years. This activity has never been condemned as violative of the Sherman Act, and the government has never so contended prior to the real estate case, he said.

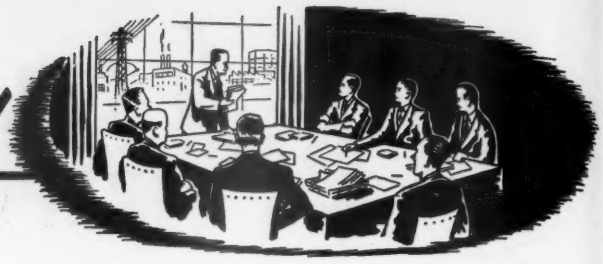
"On the contrary, the result of stabilization of charges and the consequent uniformity has generally been considered as being in the public interest. No reason is perceived for changing these principles as they have been heretofore understood."

In conclusion the court declared: "The court is of the opinion that for persons engaged in a particular occupation to fix or prescribe a standard charge for their services does not alone and of itself create an unreasonable restraint of trade in violation of the Sherman Act. A different problem might be presented if the rates fixed were shown to be unreasonable or oppressive in themselves or if it appeared that they result in a substantial diminution of competition or otherwise created an unreasonable restraint of trade or commerce. There is no such showing or even contention in this case."

Thus, in two clear decisions, it has been definitely established that persons offering skilled services may agree upon standard charges without running afoul of the anti-trust law. As previously pointed out the engineering schedules do not go nearly as far as the real estate fee schedules and hence there is added assurance that local engineering organizations should have no hesitation in promulgating and circulating their schedules.

Government attorneys have announced that an appeal will be taken from the latest decision and Judge Holtzoff also indicated that an appeal was probably inevitable regardless of his decision. It may sometime before a higher court passes upon the questions presented. In any event, later developments will be reported to the profession through the AMERICAN ENGINEER.

Accent on Activity



BY OLE SINGSTAD, CHAIRMAN

NSPE Committee on Salaries and Fees

Mounmental task of making an overall study of fees and salaries sufficiently broad in scope to include the studies and recommendations of other societies and agencies and on a nation-wide basis has fallen to this special committee.

Our task arose from a feeling of leaders of the engineering profession that there was a critical need for such a study. Immediate past-President Alex Van Praag, Jr., echoed that feeling to the annual meeting in Chicago last December, terming it an "entirely appropriate function for the National Society of Professional Engineers." He recognized, as must anyone who gives the most passing thought to the problem, that to accomplish such a thorough study and report might require from one to three years and might reasonably require an expenditure of several thousand dollars.

It was upon his recommendation, accepted by the Board of Directors, that "the Society do undertake such a study and pursue it as rapidly as its finances will permit" that this committee was created and its members appointed.

Briefly, this is the committee's organizational picture. There are 18 members of the committee — a chairman, two vice-chairmen and five sub-committees of three members each. Each of these sub-committees has in its membership individuals who are intimately familiar with one area of engineering employment.

These sub-committees will study the salary schedules as they affect employees in government, in industry and public utilities, in the teaching profession and in private practice. That accounts for four of the sub-committees. The fifth has the task of studying the matter of fees for consulting engineers.

Spotlight of professional interest was thrown upon the question of fee and salary schedules by a survey of the economic status of the engineering profession conducted by the seven major engineering societies, including NSPE, in 1946. The statistical analysis prepared by Andrew Fraser and published as *The Engineering Profession in Transition* sent NSPE members in a number of state societies scurrying to compare recommendations of the suggested schedules of fees and salaries of their state societies with the values shown to exist in the profession at the time.

As state committees began to review their schedules, it soon became apparent that there was considerable discrepancy both in the basis of the preparation of such schedules and in the recommendations that resulted. Multiplicity of schedules of fees and salaries has become even more vexing during the past few years.

Vast Job Prospect

Our committee, at the outset, was made cognizant that a considerable amount of work had been done in this field, and became convinced that the problem was of such magnitude as to require extensive study and coordination of existing studies. It was evident also at the outset that the cooperation of all societies in the engineering profession, as well as of other organizations interested in the subject, would have to be solicited. The several basic divisions which needed careful scrutiny also presented a problem.

Ordinarily prone to avoid appointment of large functioning committees, President Alan G. Stanford was, nevertheless, forced in this case to name a large committee membership in order to provide sufficient manpower to handle the scope of the studies needed in each area.

Cooperation of all major engineering societies, NSPE's member state societies, a number of state societies not affiliated with NSPE, several governmental units and other organizations already has been solicited. The cooperation from these organizations has been most encouraging and there has already been accumulated a considerable amount of data with which the committee can begin study.

First problem that faces the committee is the necessity for establishing a basis of comparison of the studies that already have been made. This, in itself, is an extensive undertaking. Once this basis has been established, it will then be necessary to evaluate the information supplied by existing studies. With this information at hand the committee will then endeavor to coordinate and evaluate the material for final presentation and recommendation to the profession.

It is too early yet to determine whether or not correlation factors will be apparent so that previous studies can be adjusted to present conditions. After thoroughly evaluating the material at hand, the committee will then decide as to whether or not it will be necessary to conduct either a sampling survey or a more complete survey to determine existing conditions.

Every member of the society is, of course, very much interested in the results of this extensive study. It will take many months for the complete evaluation of the salary and fee picture to be accomplished. However, it is confidently expected that the committee will be able to present to the engineering profession considerable factual data which will be helpful to it in further promoting its economic status.

Around The Nation With Our Members

N. Y. Society Records Banner Legislative Year

Chalk up another extremely active legislative season for New York State Society.

The NYSSPE's legislative committee, headed by Thomas M. Linville, considered it had a mandate in three spheres—to secure enactment of legislation of benefit to professional engineers; to secure defeat of legislation which the majority of the members of the society considered detrimental; and scrutinize all bills from a professional engineering viewpoint to make sure of their benefit to the people of the state.

Major effort this year was given to supporting a bill providing for a full-time secretary for the board of engineering examiners. Backed by the society in previous years, the measure was given all-out support this year—including an estimated minimum of 40 man-hours of effort by members of the committee—and has been signed into law by Gov. Thomas E. Dewey. Other fields in which the committee was active included numerous bills amending or extending the education law, the law on codes, multiple dwelling law, civil practices act, civil service law, and laws covering highways, housing, health, labor, veterans, municipalities, public authorities, public service, public works, water and water power.

All told, Linville's committee studied 38 bills introduced in the Senate and 42 introduced in the Assembly (lower house).

New Mexico Expands Magazine Coverage

Something new has been added to the official publication of the New Mexico Society.

Or rather, several things new. For one, its name has been changed to "New Mexico Professional Engineer and Contractor." For a second, it now will be expanded, both circulationwise and interestwise, to include the interests of engineering's brother field, contracting.

Ken Bellamy, editor, points out that there are very few articles which have been published in the six months since NMSPE founded the magazine that are of interest to engineering and not to contractors. The state of New Mexico is composed in a unique manner, geographically, topographically, etc., to induce a type of development in which the engineers and contractors work a good deal more closely together than has been commonly experienced in other locales.

Contractors in the state have grown to such stature that they feel the need of a common medium through which to disseminate news and notes of the activities of their respective organizations, and which will contain material they can effectively use in the course of their business or information of development or technological advance which they might apply in pursuance of their business activities.

Waste Disposal Program

Central Illinois and Capital Chapter joined forces for a meeting at Springfield to get the latest low-down on disposal of radioactive wastes. Clarence W. Klassen, chief sanitary engineer of the Illinois department of public health, was main speaker.

Fairman Honored for AIEE Leadership

When James F. Fairman, chairman of NSPE's Inter-Society Relations Committee, went to Swampscott, Mass., to become president of American Institute of Electrical Engineers, he had a surprise in store. Presented by NSPE Vice President Bill Ryan (right), the surprise was a handsomely bound leather book containing testimonials and expressions of best wishes from all NSPE officers and from nearly all of its member state societies. The gift was the idea of the Massachusetts Society, which felt that since Fairman had been preaching the gospel of better inter-society relations within NSPE, it was high time that he receive some proof that the seed he had planted had begun to show results. Assisting in presentation was Edgar A. Harty, incoming president of the Massachusetts Society. Fly leaf of the book, which Fairman spent many hours showing to AIEE friends, read: "To James F. Fairman, President of AIEE, 1949-1950, From His Friends in the National Society of Professional Engineers Across the Country. June 20, 1949, Swampscott, Mass."—Electrical World Photo.

Oklahoma Scores Success In Legislative Program

Oklahoma Society reports important successes in its legislative program during the session just ended.

Revisions of the registration law include provision for registration of engineers-in-training immediately upon graduation from an approved engineering school and passing the required written examinations, or their registration upon proof of four years or more of satisfactory engineering experience and passing the exams. Another repeals the previous registration exemption for full-time employees of public service corporations while engaged in work solely for the corporation, provided that the business of the corporation is under the regulation of the state corporation commission. State paving laws also were revised.

Credit for the work which went into successful presentation of the society's legislative program is given to William Ritzhaupt, chairman of the legislative committee, and members of that committee.

Registration Board Course Told Chapter

Assurance that the Minnesota engineering registration board is working diligently to promote professionalism in engineering was given to District 8 Chapter at a meeting in Duluth by the board chairman, George Shepard.

Shepard, who last year was president of the National Council of State Boards of Engineering Examiners and is city engineer of St. Paul, made known the board's full scope of activity at a meeting which also heard MAPE President Myhren C. Peterson, Executive Secretary R. R. Price and NSPE National Director N. T. Rykken.

Journeys End—Denver Airfield

End of the road for many NSPE National Directors who will be flying to the Fall meeting of the Board of Directors in Denver August 11, 12 and 13 will be Denver's Stapleton Field, shown in this picture. NSPE pays the expenses of one National Director from each state, plus the expenses of committee chairmen whose attendance is requested by the Washington office.

Letter Campaign Spurs Delinquent Dues Intake

A letter campaign from state society headquarters has spurred collection of unpaid 1949 dues and is even reducing the number of delinquents from 1948, Illinois Society reports.

The chapter secretaries have been linked in with the mail campaign and are redoubling efforts to assist in collecting the remaining outstanding dues.

Rhode Island Installs At Dinner-Dance Meet

Rhode Island Society has a new group of officers, installed at an annual dinner meeting at the Ranch House in Johnston, R. I.

Installed were Arthur Mather as president; Vincent DiMase as 1st vice-president; Frederick H. Paulson as 2nd vice-president; John W. King as secretary; and Joseph Wuraftic, treasurer.

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Simplicity, Directness Keys of OSPE Member Work

"For Ohio we show five times as many registered engineers in the field as we can count in the fold."

"We cannot afford to rush, shove, push or sandbag qualified engineers into joining OSPE. When such individuals recover from the first shock of becoming a member, they suddenly realize they were not properly sold and hence drop their membership at the first opportunity."

"It has been said that a professional engineer who cannot speak well of his profession is no better than the man who cannot speak at all."

With such simple statements, Hugh Kline, cairman of the membership committee of the Ohio Society, is outlining to members of OSPE the membership potential that lies before them, the proper method of soliciting non-members and the need for preaching the engineering gospel—properly—throughout the state.

Eighteen Texas Chapters Endorse Law Test Plan

Eighteen of the 19 chapters of the Texas Society have given full support to a program for testing validity of the Texas engineering registration law, Paul Perry, vice-president of the Waco Chapter, reports.

The program originated with the Waco Chapter and called for a $5 per member assessment within TSPE to finance the test. The program was brought to state level attention by introduction of a resolution at the TSPE convention in Waco last January. Plans call for employing an attorney, the selection of a test case and trial of the case under a civil suit.

NSPE Member Leaves Post, Another Member Successor

A change of engineering college deans at University of Illinois finds one NSPE member stepping out, another stepping in.

Dean M. L. Enger, who is active in the Illinois Society and is a past-president of that organization, is slated for retirement September 1. Stepping into the post will be Prof. William L. Everitt, presently head of the electrical engineering department.

Chapter Publication

Another chapter of the Ohio Society —Miami, serving Butler, Preble and Warren counties — has launched its own publication. The newsletter-type, monthly publication is known as *The Miami Record.*

New officers are in command of the following NSPE affiliates.

North Shore (Mass.) Chapter—L. P. Shildneck, president; Jack R. Dunn, vice-president; E. R. Gardner, secretary; C. C. Barker, treasurer; John A. Groncki, membership secretary; and directors, N. B. Mitchell, R. E. Wiggin, E. E. Lynch and E. A. Harty.

* * *

Toledo (Ohio) Chapter—A. E. Freyer, president; E. V. Newman, vice-president; G. E. Neeper, secretary; C. W. Cisco, treasurer; and directors, R. E. Hall, Charles Hatch, H. H. Kerr and R. M. Hanselman.

* * *

Franklin County (Ohio) Chapter—Col. Rawl M. Edgar, president; Loring T. Hunziker, vice-president; Earl Sanderson, recording secretary; Eugene Davis, secretary-treasurer.

* * *

Colado

Cincinnati (Ohio) Chapter — Ramon Colado, (pictured) president; L. W. Graf, 1st vice-president; Jay Bauman, 2nd vice-president; Harry J. Long, treasurer; and Alfred LeFeber, secretary.

* * *

Niagara County (N. Y.) Chapter—Walter M. Buehl, president; Philip H. Goetzman, vice-president; Donald E. Springer, secretary; and Ernest C. Ansley, treasurer.

* * *

Northeast (Ohio) Chapter—Frank W. Shelton, Jr., president; Fred A. Collins, vice-president; R. M. Plummer, secretary-treasurer; and trustees, E. B. Humphrey, F. R. Zethmayr and C. C. Hadden.

Canton (Ohio) Chapter—E. C. Coldren, president; Everett P. Hamilton, 1st vice-president; Wilbur Sponseller, 2nd vice-president; Douglas T. Greth, secretary-treasurer; and trustees, Karl Snyder, Chester Muckley and Harrison Sherer.

* * *

Berkshire (Mass.) Chapter — William C. Hurt, Jr., chairman; Joseph Franz, vice-chairman; Crawford M. Adams, secretary-treasurer.

* * *

Connecticut Valley (Mass.) Chapter —Arthur A. Davis, chairman; Edward D. Ripsarda, vice-chairman; Denver W. Hoot, secretary; Donald L. Ross, treasurer; Benjamin R. Bushey, state society director.

* * *

Metropolitan (Mass.) Chapter — William P. Saunier, chairman; Norman T. Buddine, vice-chairman; Hugo L. vonRehberg, secretary-treasurer; William J. O'Malley, assistant secretary-treasurer; and directors Arthur W. Pratt, Gilbert Small, George F. Ferguson and T. Mitchell Hastings, Jr.

NY PE License Plate Rules Formulated

Rules for distribution of 2,000 special license plates bearing the designation "PE" have been formulated by the New York State Society, to which responsibility for allocation of the plates has been relegated by the state bureau of motor vehicles.

All of the low number plates will be assigned to past presidents of NYSSPE, in the order of their service; to state society officers; to chapter officers; and professional engineers within the state who have outstanding records of service to the public, the profession and the society. Distribution of the plates will not be limited to members of the society, under the NYSSPE rules, but will be available to any registered professional engineer in the state.

New York considers the PE plates, which will be distributed for 1950 use, to be another important step in publicizing the initials designating a professional engineer. New York also issues MD plates to physicians.

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British Science Unable To Match US Productivity

Take it from an NSPE member who spent a year observing British science, it cannot match Yankee productivity.

W. R. Woolrich, a member through the Texas Society and dean of the college of engineering of the University of Texas, reports that while basic science is more advanced in England than in the United States, British scientists time and time again are forced to sit by while some other country steps in and makes their discoveries pay. As a result, the British government now owns and controls many principal patents—its method of recouping such losses. And the British government can go into partnership with private business to make use of the patents.

British scientists are more aware of what Americans in the same field are doing than Americans are of British activity. Universities, he continues, ordinarily heavy contributors to research, have been caught in the high cost of undergraduate teaching, with money heretofore available for research activities being drained off by inflated teaching expenses. What little sponsored research is offered through grants from private companies goes largely to individual scientists rather than institutions.

Money spent for research by industry is tax-free, but some companies, particularly the smaller ones, are taking advantage of the tax exemption by listing expenses which cannot be classified as scientific research—time and motion studies are one example. Most basic government research is under three government agencies — the department of scientific and industrial research, the medical research council and the agricultural research council. Defense and atomic energy research, done outside of these agencies, are developed through the laboratory stage to usability; then any of 40 divisions, each with an applied research division, takes over for development.

Dean Woolrich spent the year in Britain as chief scientific officer with the American embassy in London. He made an analytical survey of Britain's scientific developments and served as scientific liaison officer between civil scientists and engineers of Great Britain and the United States.

Directory Issued

Publication of a new membership directory has been completed by the Central Illinois Chapter. The directory was published under supervision of a committee headed by Vail H. Moore.

Dates to Remember

NSPE Board of Directors—August 11, 12 & 13th, Cosmopolitan Hotel, Denver, Colo., Fall meeting.

Wisconsin Society — August 5 & 6, 1949, Northland Hotel, Green Bay, Wis., Summer meeting.

New Jersey Society — September 10, 1949, Old Orchard Country Club, West Long Branch, N. J., semi-annual meeting.

New York State Society—September 16 & 17, Hotel Queensbury, Glens Falls, N. Y., Autumn meeting.

National Society of Professional Engineers — December 8, 9 & 10, Rice Hotel, Houston, Tex., 1949 annual meeting.

Illinois Society—January 26 & 27, 1950, Orlando Hotel, Decatur, Ill., annual meeting.

Ohio Society — March 16, 17 & 18, 1950, Dayton, Ohio, annual meeting.

Connecticut Society — March, 1950, Bridgeport, Conn., annual meeting.

New York State Society—May 4, 5 & 6, 1950, Statler Hotel, New York City, Mid-Century Convention and Engineering Industries Exposition.

Pennsylvania Society—May 19 & 20, 1950, New Castle, Pa., annual meeting.

Massachusetts Society—June 8, 9 & 10, 1950, Hotel Statler, Boston, Mass., annual meeting in conjunction with NSPE annual meeting.

DC Prexy Polls Members On Committee Positions

Members of District of Columbia Society won't be able to blame President Melville L. Brown for distasteful committee assignments.

By stamped, self-addressed postcard, he polled all members of the society to learn their preferences on committee assignments. That was done because members of the various committees, Brown felt, should be those who have a particular interest in the scope of the various functions of their group as well as a willingness to devote time and effort to their activities.

Through the device, new members also were given a chance to enter activities of the committees.

Man Slated for MAPE Presidency Succumbs

Death has ended the long career of a man who was to have been president of the Minnesota Association of Professional Engineers during the current year, Wright S. Cockroft.

Assistant city engineer of St. Paul, Cockroft more than a year ago was designated president-elect of MAPE and would have ascended to the presidency late last Winter had not illness struck. He was a charter member of MAPE, was a member of District 4 Chapter, and was generous of his time and energies in its affairs.

He had been ill for six months.

Toledo Program Planned For Year in Advance

Toledo is another chapter that apparently is firmly convinced of the value of advanced planning of chapter programs.

June issue of the Toledo Engineer, the chapter's news bulletin, carried the full schedule of chapter programs for the 1949-1950 year. And diversity of the programs is evident. In succedding months (starting in September), the chapter will hear a newspaperman—Grove Patterson, president and editor, Toledo Blade—give his ideas about the engineer and his ideals; an educator—Dr. Frank C. Hockema, vice-persident and executive dean of Purdue University — discussing engineering college curricula; have a review of building codes covering structural steel design; hold two engineering registrations certificate presentation meetings; hear another educator—Dr. Arthur Flemming, president of Ohio Wesleyan University—discuss the Hoover commission report for reorganization of the executive branch of the government; get a slant on the engineer as a salesman from a sales executive—N. L. Schmid, vice-president and general sales manager of Woolson Spice Co.; hold a management night, with Joseph H. Nuffer, president of Air-Way Electric Appliance Corp., discussing what the engineer means to industry; get a few slants—from Robert C. Dunn, an attorney—on the legal side of a profession; hold an annual meeting, at which the new president of the Ohio Society will be speaker; then wind up with the annual stag party, golf tournament and outing.

Central Arizona Chapter Formed, Officers Named

Organization of Central Arizona Chapter has been completed by the Arizona Society under the direction of Walter Croft, state president.

Named as first officers of the new chapter were Carl C. Huskison, president; Walter Burg, vice-president; Neil McLeod, secretary-treasurer; Roy T. Richards, trustee-at-large; and Earl F. Hastings, state board member.

Named chairmen of standing committees were Clifford C. Sawyer, professional practice and ethics; Tom Merrell, membership; Walter A. Burg, program; J. E. Stephens, legislative; Homer K. Richards, auditing; Remo Ravioli, registration; and Edward E. Tufte, publicity and publications.

N. D. Society Solves Publication Financing

Financing a state society publication is a tough nut to crack, particularly where the potential membership is relatively small.

But North Dakota, which can point to a society membership encompassing more than 83 per cent of all registrants in the state, has come up with a solution that is destined not only to provide a contact with members but an excellent recruiting weapon as well.

For a long time, leaders of NDSPE have felt the need for a news medium covering the affairs of the state society. But the society was small and could hardly afford a real worthwhile magazine—and mimeographed sheets are so often consigned to the waste paper basket without reading that publication in that form was not acceptable. Following publication of some society information in one issue of one of the two college engineering magazines in the state, it was suggested that the society utilize the facilities of these two publications.

Both schools publish engineering college magazines similar both in name and appearance. So NDSPE furnishes the same material to both magazines, its printed and alternate editions—to equalize any college ambitions and to minimize rivalry—are mailed to the membership. In addition to getting a state society news letter into the hands of the entire membership regularly, the arrangement has the additional advantages of introducing the students of NDSPE and NSPE and its affairs—and bridges the gap between the working profession and the colleges, giving the former a better insight into educational, financial and other problems.

Are You an Active Member?

Are you an active member,
The kind who would be missed
Or are you just contented that your name is on the list?
Do you attend the meetings,
And mingle with the flock
Or do you stay away
And criticize and knock?
Do you take an active part
To help the work along
Or are you satisfied to be
The kind who "just belongs"?
Do you ever work on committees
To see there is no trick,
Or leave the work to just a few
And talk about the clique?
So come to meetings often,
And help with hand and heart;
Don't be just a member
But take an active part!
Think this over, brother,
You know right from wrong,
Are you an active member,
Or do you just belong?

Author unknown.

What NSPE Members Do Shown in New Survey

Next time a prospective member asks just what members of NSPE do in the engineering profession, here's your answer.

An analysis of membership data cards on file at the Washington office reveals:

11.1% are partners;
17.4% are chief executives in the firms they serve;
10.2% are assistant executives;
23.8% are department heads;
11.4% are sub-department heads;
4.7% are squad crew chiefs;
9.3% are specialists;
2.8% are technical assistants; and
9.3% are in other classifications (teachers, owners, private practitioners, etc.).

Illinois Building Fund Bond Pledge Total Climbs

Pledges for more than half of the $50,000 in 20-year bonds the Illinois Society is to issue to provide funds for its new headquarters had been subscribed by mid-July, indicating a fast start on the project.

Each chapter affiliated with ISPE was assigned a quota of the bonds, and they were held open until July 15. After that date, quotas assigned to slow signing chapters were made available to those chapters which had filled their quotas.

Meanwhile, legal details of the purchase, which will give ISPE the first society-owned headquarters in the NSPE organizational pattern, have been checked and approved by legal counsel; plans for rebuilding the burned-out structure have been reviewed by the executive committee and checked with prospective tenants. Rent from office space in the structure will provide the Illinois Society with free office space and permit amortization of the debt.

Washing Machine Story Given Ladies' Night Meet

Pass the laurels to North Central (Ohio) Chapter for turning up with an engineering program for a ladies night affairs that was as of much interest to the members of the fairer sex as it was to the men.

Featured were three engineers of Westinghouse Electric Corp., Mansfield, but far from being technical, they were on hand to explain operating principles and development behind automatic washers and clothes dryers—something very close to any woman's heart. And they came with demonstration models so that the women—and their husbands—could get a first hand view.

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BLS Survey

(*Continued from Page* 4)

Employers and independent consultants had highest annual incomes in all fields of engineering, with large amounts being derived from fees and bonuses.

Engineers in Other Fields

13. The close relationship among all the branches of the profession, and the similarity of basic engineering training, make it possible for some engineers to shift from one branch to another. In 1946 more than 20 per cent were employed in a branch of engineering other than that in which they had received their training. Largest chart indicates the proportion of engineers educated in each engineering branch who were employed in another branch of the profession by 1946, and shows the distribution by the branches of engineering in which they were employed. While it is not known at what time the survey respondents made the change from their basic field of education to a different field of employment, there is evidence that these changes do not happen only during a period of shortages of engineers. An earlier Bureau survey of the engineering profession in 1935 showed that as many as 11 per cent had made such changes during their working lives.

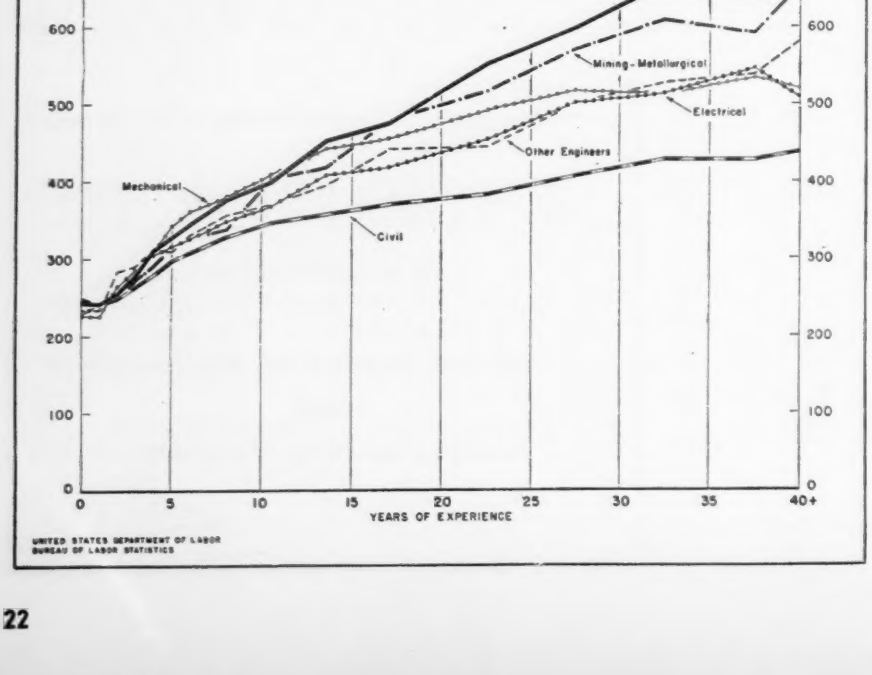
Under the impact of the wartime demand for engineers, many shifted from one branch of the profession to another; from 8 to 14 per cent of the engineers who had been employed in each of the five major branches of the profession in 1939 had moved to some other branch by 1946. Percentage gains were greatest in mechanical engineering; civil engineering lost the greatest proportion to other fields.

Approximately 22 per cent of the engineers shifted from one major type of employer to another. These changes reflect the principal sources of employment for engineers during the war and postwar years. Between 1939 and 1943 employment in private firms and in the federal government increased chiefly at the expense of state and local governments and self-employment. From 1943 to 1946, relatively more engineers transferred from public employment to private industry than vice versa.

At least 25 per cent of the engineers changed their industry fields during the seven-year period; these changes appear to reflect the high wartime demands for engineers in the "heavy" or durable goods industries. More than 30 per cent of the engineers changed their employment location from one state to another between 1939 and 1946. This is a greater proportion than were involved in any of the other types of changes analyzed. The majority of those who moved from their 1939 employment location did so by 1943.

Flood Breaks Spell

Ordinarily, when Ft. Worth (Tex.) Chapter schedules a meeting for one month its held that month. But the spell has been broken now—flooding of the Trinity River meant a month's delay in scheduling of one chapter meeting, and that one month saw two chapter meetings.



Van Praag Still Preaches NSPE Gospel at Every Turn

Same missionary zeal which Alex Van Praag, Jr., showed in his term as NSPE president is still evident as he continues to preach the professional gospel at widely scattered points throughout the nation.

One of his latest appearances was at Villanova College, Villanova, Pa., where he detailed growth of the professional movement to 250 student engineers and professors. The meeting was arranged by Dean J. Stanley Morehouse of the college's engineering school. Among points he stressed were:

"NSPE does not seek to destroy any existing engineering group or society. Neither does it seek to dominate the engineer or the engineering profession. It seeks only to unify the professional men and segments of the profession in one large group with strictly professional objectives. In doing so, it is unalterably pledged to cooperation with any or all other groups with professional objectives.

"Engineering as a profession has not received due professional recognition. The terms 'engineer' and 'engineering' have become commonplace. Engineering accomplishment has become an accepted and expected fact. Engineers must unify themselves and again bring public consciousness to recognize that engineering is a profession and should be accorded professional standing.

" . . . in order for the engineer to preserve professional status, there must be high educational standards and high standards of practices and ethics. These must be accompanied by professional accomplishment. With this combination, engineering will assume its proper place and professional level. This combination will produce not only a well deserved professional recognition but social and economic security as well.

"The future of professional engineering is a bright future indeed if we only avail ourselves of it and do the job that is to be done 'professionally.' More than 260,000 of those who practice engineering in the United States are qualified to register as professional engineers. The potential influence of this number, united for advancement of the profession and acting to better serve the public welfare and society, is tremendous."

City Officials Guests

A stag picnic at which the city manager, Rod Thomas, and city councilmen were honored guests wound up the 1948-1949 season for the Dallas (Tex.) Chapter.

New Tulsa Auxiliary Elects First Officers

First officers of the newly organized Tulsa (Okla.) Chapter's auxiliary have been named, and sights are now being set on playing hostess to the state society convention next January.

The officer roster includes Mrs. Floyd Zook, president; Mrs. Allan Craig, 1st vice-president; Mrs. Charles B. Gannaway, 2nd vice-president; Mrs. Charles A. Cone, 3rd vice-president; Mrs. Cline L. Mansur, secretary; Mrs. W. W. Wheeler, treasurer; and Mrs. Percy F. Blair, Jr., parliamentarian.

Chairmen of top committees named for the year include Mrs. Parker Patterson, arrangements; Mrs. Glenver McConnell, program; Mrs. H. D. Collins, finance; Mrs. L. E. Gibbs, membership; Mrs. Charles A. Liming, telephone; Mrs. William Fell, publicity; and Mrs. C. P. Stanley, historian.

Waddleton

(*Continued from Page 6*)

crease its active support, particularly among the members of the legislatures, at the times when unifying amendments are being considered.

Underlying the whole approach to this problem of effectuating the licensing of engineers is the basic fact that the practice of engineering is indeed a profession. Being a profession, the motivation of its members is, as the Constitution of the National Society of Professional Engineers succinctly puts it, "Service to Society."

Again, and just a bit more elaborately, it is put in this way in "Faith of the Engineer:"

"When needed, my skill and knowledge shall be given without reservation for the public good. From special capacity springs the obligation to use it well in the service of humanity; and I accept the challenge that this implies."

Isn't it because engineers have not allowed secondary considerations to interfere with the full play of this individualistic motivation that the profession has contributed so vastly to the development of our society and economic wealth? One can't help but contrast this professional type of motivation—or even dedication — with the collectivistic, all-levelling, restrictive motivation controlling certain trade unions, for example.

Development Pattern

In connection with the perpetuation of this motivation of yours, one cannot read your literature without soon noting that you recognize that professional principles cannot be inculcated by legislation or regulation. This, of course, is true. They must be adopted in the hearts and minds. But do not, on that account, unduly discount the advancement that can be made in even further establishing engineering as a profession by the licensing procedure and the prevention of incompetent practice through the work of your examining boards and professional societies.

The other area for vigilance is in determining the qualifications for license. This field includes such subjects as the accrediting of schools, grandfather clauses (the constitutionality of which has generally been upheld), the diploma privilege, the norms for determining good character, and the type of examinations to give where they are required.

It would hardly be appropriate for me, a non-engineer, to propose to solve such problems. That must be done within the profession. As a lawyer, however, I can point out that it is in this area that you have the discretionary power, almost absolute, to foreclose the right of individuals to work in the field of professional engineering. By the imposition of too arduous an examination, you may be denying some young man who has completed an engineering course of training in a good school the right to practice in the profession of his choice.

In the case of licensing of engineers, the necessity to give consideration to the protection of the public interest provides the occasion where, in all good faith, actual but unwarranted deprivation of the right to work may unconsicously be brought about.

In this connection, a statement from the November, 1947, meeting of the National Council of State Boards of Engineering Examiners in New York is food for thought.

That statement is:

"No longer will a national certificate be issued simply on the basis of graduation from an approved engineering school coupled with four years of satisfactory experience.

"Applicants must now have a record of ten years in the practice of engineering and must pass a written examination approved by the Council."

Unless it is true that such extension of the qualification for certification is necessary for the protection of the public—and, the answer to that question rests almost entirely in the sound judgement of your profession—such extensions could well result in the deprivation of the right to work in the profession.

In the same report, it is also noted that in the state of New York out of 40,000 applications for licenses, 20,000 were denied, and some of those unable to secure a license were practicing as engineers. The question can be frankly asked, were all 20,000 whose applications were denied of such a degree of incompetence that their practice of the profession would have endangered the public interest?

In conclusion, these points are respectfully posed for your consideration:

1. The practice of engineering is sufficiently affected with the public welfare to warrant proper licensing regulations restricting the right to work in the field;
2. Legislative grants of board, discretionary authority to examining boards will be sustained in the courts;
3. The exercise of such discretionary power by the boards will also be sustained by the courts unless it is wholly arbitrary or unreasonable;
4. Therefore, the preservation of the right to work in the profession is to a large extent the responsibility of the profession itself;
5. The right to work as guaranteed by our Federal Constitution is one of the promises we have made to ourselves down through the years;
6. It is one of the promises we give to our children when we send them to engineering schools, to medical schools, and to law schools; and
7. Where the effectuation of that promise falls within the jurisdiction of your profession, let steps be taken that it not be "lost" through obsolescence."

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Augusta Asks County Planning Body Creation

A resolution calling upon its home county to activate a planning and zoning commission with power to control all proposed commercial, industrial or residential developments has been passed by the Augusta (Ga.) Chapter.

It declares that the city of Augusta and Richmond county are growing and can be expected to continue to grow; that there is not now employed an engineer to make recommendations to the county board and/or pass on proposed commercial, industrial and residential developments in the county in a sound and comprehensive manner; that there is no planning and zoning commission to control such developments; that it is considered to be to the economic advantage of the tax payers of the county to maintain controls over proposed developments; and that the orderly development of the county, particularly the urban areas in the vicinity of and just outside the city limits of Augusta, is dependent upon some comprehensive planning and zoning controls.

The resolution also offered the services and assistance of the chapter to the county board in any discussions relative to activation of the commission, and pledged that when such a commission is formed, the chapter "stands ready to counsel with such a commission in the prosecution of its duties."

Beach Pollution Work Outlined by Engineer

Kings County (N. Y.) Chapter wound up its Spring season by hearing the chief of the bureau of sewage disposal operation of the New York department of public works outline how that city has moved to combat harbor pollution.

But even as the chapter wound up this season's activities, it announced a head start on those for the Fall. Kick-off meeting, on October 20, is to hear Harry D. Belock, executive vice-president of the Reeves Instrument Co., detail operations of an electric analogue computer which can solve in 45 minutes work requiring 16 days to compute by longhand. The machine was to be available for inspection and demonstration.

At the November 17 meeting, the chapter program committee planned to call on Charles W. Mitchell, president of the NYSSPE-NSPE affiliate, for a discussion of electrical systems for the protection of life and property from fire. Mitchell is president of Acme Fire Alarm Co.

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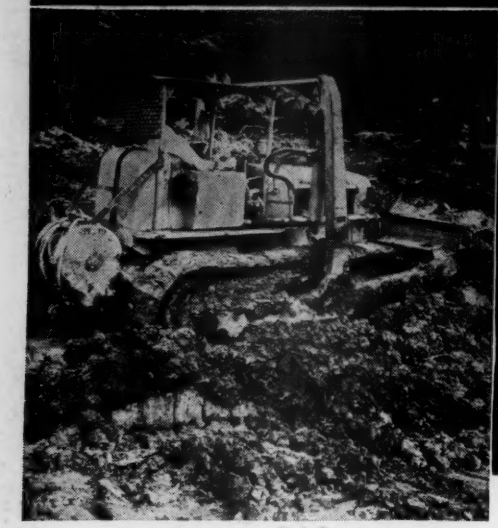

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